Evidence on the Impact of Internal Control over Financial Reporting on Audit Fees

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Abstract

Introduction: Circa 1992, the *dot.com sector* created an irrational stock-trading market where the usual "financial" profiles of: Liquidity, Cash Flow from Operations, and Revenue generation were replaced by Ponzi-esque mayhem. To stabilize the markets, the Public Company Accounting Oversight Board [PCAOB] required a second audit opinion: the COSO Opinion on the adequacy of management's system of Internal Control over Financial Reporting: [ICoFR].

Study Focus: Three COSO-[ICoFR] designations are now required as public information: (i) A "clean" opinion [Is Effective], (ii) Deficiencies are noted, and (iii) Weaknesses reported. Our research interest is to determine, for a panel of randomly selected firms traded on the S&P500 for a eleven-year period: 2005 to 2015, the nature of the effect that the COSO deficiency reporting protocol has on (i) Audit Fees and (ii) the Market Cap of traded firms.

Method: To this end we collected, using the Audit Analytics ™[WRDS™] database, various categories of reported Audit Fees and also Market Cap information. This random sample was classified into two sets: the first group: Is Effective SEC 302 Designation and No COSO issues & the second group: Is Not 100% Effective for which there were SEC 302 Deficiencies or Weaknesses noted.

Results: Inferential testing indicates that failure to attend to the PCAOB-COSO imperatives results in a relational where there are higher Audit Fees and a slippage of the firm's Market Cap compared to the Is Effective Group. The PCAOB's protocol to require the Audit of the firm's ICoFR system and make that evaluation public information seems to be an excellent corrective "Carrot and Stick".

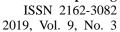**Keywords:** Carrot and stick, PCAOB, Protocols

1. Introduction

1.1 Control Context

The accounting information system [AIS] is used to inform management on decisions that need to be made to realize the effective and efficient use of the resources committed to the organization so as to provide a reasonable return to the shareholders. One of the critical sub-systems in the control milieu of AIS is to enable management to have adequate control over financial reporting. Lacking adequate control for the information generated by the AIS there is not likely to be adequate "*Catch & Correct*" Error protocols possibly resulting in Material Errors in the Firm's Financials that could result in class-action law-suites or regulatory interdictions that would compromise the ability of the organization to continue into the future-*Enron™ Inc*., is, of course, the prototypical example of the predictable final result of the lack of Internal Control over Financial Reporting [ICoFR].

1.2 Evolution of ICoFR

Initially, The Foreign Corrupt Practices Act [FCPA] of 1977 [revisions: 1988 & 1998] addressed informational clarifications of the Securities Exchange Act of 1934 and defined

aspects of the internal control relative to transparency of reporting and corruption issues; the FCPA act distinguishes between "administrative control" and "accounting control" and states that the latter is concerned with the "safeguarding of assets and the reliability of financial records". Accordingly, all companies registered with the Securities and Exchange Commission [SEC] have been required to institute and maintain a system of internal control. On the other hand, the Generally Accepted Auditing Standards (GAAS) define internal control as dealing strictly with the reliability of financial reporting (SAS No. 55) which slightly differs from the pronouncement of the Institute of Internal Auditors about internal control that goes beyond financial reporting matters and encompasses certain operations and compliance controls. See Kelley, Chapin & May (1993). Under the GAAS reporting standards, auditors were required to consider internal controls when planning the audit engagement, but were not required to test internal controls if they decided not to reply on them. The only public disclosure requirements related to internal control deficiencies were under Financial Reporting Release (FRR) No. 31 (SEC 1988), which requires companies to disclose certain reportable events about internal control and financial statement reliability in an 8-K when an auditor change occurs. Hogan and Wilkins (2008), in 1992, the Committee of Sponsoring Organizations of the Treadway Commission [COSO] released its landmark report, *Internal-Control-Integrated Framework* which calls for the responsibility of creating an adequate system of ICoFR to be clearly fixed as Managements. Finally, in 2002 the Public Company Accounting Oversight Board [PCAOB] was created under the egis of the Sarbanes-Oxley Act, commonly called SOX: [US-Federal Law: HR: 5614 passed unanimously] the intention of which was to restore trust in the information provided by firms traded on public market exchanges-thus addressing the lack of reasonable assurance provided by Management and also the Assurance LLPs of the 1990s. The PCAOB moved with dispatch to leverage the COSO report and required a second Opinion, the so called COSO opinion, to report on the adequacy of management's system ICoFR (Note 1); this second opinion was jointly supported by the AICPA and the SEC (AICPA, 1974). The latter required public information to be made available on the nature of the system ICoFR: *Is Effective*, *Deficiencies* Reported or *Weaknesses* Reported. As a simple summary: Yang & Guan (2004) and Wei (2015) suggest that the PCAOB was spot on to identify that firms traded on public exchanges must be held accountable for establishing and using protocols integrated in the AIS to "*Catch & Correct*" errors and defalcations that would create errors of a material nature in the financial statements provided to investors.

To enforce this mandate of SOX: 2002, PCAOB promulgated Audit Standard No. (2) [AS2] which defines the ICoFR as:

a process designed by, or under the supervision of, the company's principal executive and principal financial officers, or persons performing similar functions, and effected by the company's board of directors, management, and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles (PCAOB, 2004, 154).

1.3 Elaboration

For such controls to be adequate, they should ensure, to a reasonable extent, that material error, i.e., error in the Financials of the firm that would likely change investor behavior(s), will be detected and corrected by the management before the issuance of the financial statements. Hence, the effective controls should affect the audit risk by reducing control and detection risks, which should lead in the long-term to decreases in assurance audit fees. And so, market return theory would suggest that there would be an improvement in the trading value of the stock of the firm. In this context, SOX section 404 requires that the external auditor reports on the effectiveness of ICoFR, including management's assessment of their system of ICoFR (Ernst & Young, 2005). SOX section 404 became effective for fiscal years ending on or after November 15, 2004 for accelerated filers and are made public by the SEC 302-Disclosures. This is the point of departure of our study that examines the reporting and disclosure effects re: ICoFR on Audit Fees and the Market performance of Firms traded on market exchanges.

2. Literature Review and Hypotheses Development

2.1 Literature Review

Research before the promulgation of AS2: Sec. 404 found no evidence that "audit effort", a proxy for audit fees, is sensitive to reliance on internal controls (O'Keefe, Simunic & Stein 1994; Hackenbrack & Knechel, 1997; and Felix, Gramling & Maletta, 2001). However, research reported subsequently found that ICoFR issues/weaknesses are associated with higher audit fees in the year of their 302-disclosure. See: Raghunandan & Rama (2006), Hogan & Wilkins (2008), Hoitash, Hoitash & Bedard (2008) and Ashbaugh−Skaife, Collins, Kinney Jr. & LaFond, (2009). This is exactly what the PCAOB would have hoped for in addressing issues that dealt with ICoFR-to wit: the 404 & 302 reporting requirements would act as a "*Carrot or Stick*" depending on the adequacy of management's system of ICoFR. For example, Raghunandan and Rama found the average audit fees for 660 companies in 2004 (after the issuance of SOX 404) were higher than in 2003. Hoitash, Hoitash, and Bedard extended their study and found, as expected, that audit fees for companies with internal control problems/weaknesses/issues varies by the severity of the problem. Furthermore, Albring, Elder, and Xu (2018) noted that the auditor's awareness of increased internal control risk in one year, which does not warrant the reporting of a significant deficiency or material weakness, might increase audit fees in the subsequent year either due to further deterioration in controls, additional deficiencies, or an audit adjustment. Finally, there is also confirmatory evidence relative to IPOs where ICoFR deficiencies regarding pre-IPO reporting are associated with higher Audit Fees. Lee & Lee (2018) note that this "- - - *suggests that auditors adjust audit fees for the increased control risk.*"

Accordingly, we find it relevant to extend this line of research by examining the relationship between the ICoFR and the Audit Fees as benchmarked by the Firm's Market Cap for Firms that have had issues with internal control compared to firms where there were no such reported issues. Our study, therefore, offers information on the PCAOB-*Carrot* where firms providing adequate ICoFR will experience: *relatively lower audit fees and a higher Market*

Cap compared to the PCAOB-*Stick* where firms that fail to address the PCAOB's COSO imperative will experience: *relatively higher audit fees and a lower Market Cap* as 302-reports on the COSO inadequacies are aired in the public domain. Specifically, we examine the change in audit fees, non-audit fees, and audit related fees in relation to the evaluation of the ICoFR and the impact on Market Cap.

2.2 In Overview

This study is a longitudinal time-series tracking of 10-Q reports and the Sec. 404 public information accrued found in the 302 disclosure reports from the WRDS™ Audit Analytics™ (AA:WRDS) database for eleven years (2005-2015). These empirical findings will thus extend the prior research by providing additional evidence from traded firms from the roll-out of AS2 and through AS5.

2.3 Pre-test Vetting and Hypothesis Context

Using the SEC 302-disclosure coding [Is Effective, Deficiencies, and Weaknesses] to create a bi-partition of a random sample of firms traded on an exchange and the Audit Fee variables offered by the AA:WRDS data platform, we propose the following hypothesis.

H_a: *Firms that have created and maintained an Effective system of ICoFR will have a ratio advantage measured on: Audit fees as benchmarked by the firm's Market Cap compared to that of firms that have had reported 302 Disclosure Control issues.*

2.3.1 Logic of Testing Context

We proffer that for a firm traded on an established exchange the ratio of Audit Fees to Market Cap [AF/MC] is a logical measure of performance efficacy as:

Condition (A): *If a firm has an effective system of ICoFR, then by definition, the risk of the audit will be relatively lower compared to firms that have control issues pertaining to their system of ICoFR.*

Condition (B): *If a firm has an effective resource conversion system, the trading market should value this and so their Market Cap should be higher than a firm that has been flagged by the SEC/Auditor as not having an adequate system of ICoFR.*

2.3.2 Discussion

These two conditional relationships should produce a lower ratio AF/MC for firms judged to have an adequate system of ICoFR compared to the firms that have been judged by an inadequate ICoFR. If this is the case, then this would provide support for the requirement of the PCAOB: AS2/AS7 to require an opinion for traded organizations to attest to the adequacy of ICoFR and to require the assurance evaluation to be made public. Specifically, if we find that there is NO effect for attending to the COSO dimension of the Attestation as measured by the AF/MC, then this would suggest that the mandated PCAOB requirements are superfluous and, in fact, is not a variable sensitive to the market where the firm is traded-Simply the ICoFR- "*Carrot & Stick*" as configured would be ineffective.

2.4 Research Methodology and Design

We are testing the above hypotheses through an inferential model where we have created a simple set of contrasts amenable to providing inferential assurance in the p-value context. Consider now the specific of the testing context.

2.4.1 Sample

We used a random sample of the public-listed companies traded on the S&P500 that have filed their 10-K reports with the SEC for each year during the period (2005-2015). For those companies, we collected from the AA: WRDS database three types of measures of audit effort: Audit Fees, Non-Audit Fees, and Audit-Related Fees. Finally, we used the CRSP™ [WRDS] market price for these firms to create their Market Cap.

2.4.2 Variables and Definitions

We selected three variables that are reported in AA: WRDS which have been defined by the UPENN Data Dictionary® as follow:

· Audit Fees [AF]:

Consists of all fees necessary to perform the audit or review in accordance with GAAS. This category also may include services that generally only the independent accountant reasonably can provide, such as comfort letters, statutory audits, attest services, consents and assistance with and review of documents filed with the SEC.

· Non-Audit Fees [NAF]:

The sum of audit related fees, Benefit Plan Related Fees, FISDI Fees, Tax Related Fees and Other/Misc Fees.

· Audit-Related Fees [ARF]:

In general, they include assurance and related services (e.g., due diligence services) that traditionally are performed by the independent accountant. More specifically, these services would include, among others: employee benefit plan audits, due diligence related to mergers and acquisitions, accounting consultations and audits in connection with acquisitions, internal control reviews, attest services that are not required by statute or regulation and consultation concerning financial accounting and reporting standards.

The first variable [AF] is the principal study variable; the other two variables [NAF & ARF] are variables that will be used in a set of vetting tests that will condition the inferential information gleaned from the tests of AF/MC.

2.4.3 302-Disclosure Definitions

As indicated previously we will use the variables: *Effective*, *Significant Deficiency* and *Material Weakness* as they pertain to the COSO 302-report to code the Firms in the study. Consider these three variables.

· Effective

ICoFR refers to providing reasonable assurance that management's system of Internal Control over Financial Reporting as Integrated in the AIS will create the "*Catch and Correct*" platforms that will provide reasonable assurance that the information reported in the firms' financial statements is free from material error. If one or more material weaknesses exist, the company's ICoFR cannot be considered effective (PCAOB, 2017) and so will NOT be rated for the Annual [10-K] or Quarterly [10-Q] submissions as Effective.

Initially, the SEC did not give definitional or taxonomical precisions so as to aid the auditor in deciding between Deficiency (ies) and Weakness (es); however, to coincide with PCAOB's roll-out the revision of AS2, called AS5 in 2007, the SEC offered the following two definitions:

· Significant Deficiency

"A deficiency, or a combination of deficiencies, in internal control over financial reporting that is less severe that a material weakness, yet important enough to merit attention by those responsible for oversight of the registrant's financial reporting" (Note 2).

The second, comparatively more serious issue is labeled:

· Material Weakness:

"a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of the registrant's annual or interim financial statements will not be prevented or detected on a timely basis by the company's internal controls" (Note 3).

2.5 Binary Classification of Firms

For the purposes of classification of the firms accrued to test *Ha*, given that the nature of these 302-Disclosure terms did not have a consistent taxonomical basis over the full Panel, we formed two testing Firm-blocks over the 44 10-Q Panel filings:

Firms that do NOT have any COSO issues [noted as: F_i^+],

Where: For each and all 10-Q filings the 302-report was: the ICoFR was: Effective, [referenced as: 302EIC], and

Firms that exhibit COSO issues in their ICoFR [noted as: F_j^-]

Where: For each and all 10-Q filings the 302-report was: the ICoFR was *Not Effective*: meaning that either of the following is reported:

An indication of a *Significant Deficiency* [reference as *302SD*] with respect to the ICoFR, or an indication of a *Material Weakness* [reference as *302MW*] with respect to the ICoFR.

2.6 Market Capitalization

As the Market Capitalization [Market Cap] changes each day and the audit is an annual event, we measured the firm's annual Market Cap [*MC*] over the Panel as follows: Using the monthly market price in the S&P500 [WRDS: Center for Research in Security Prices [CRSP™]] we took the geometric mean (Note 4) of the monthly share prices multiplied by the annual number of outstanding shares reported by AA: WRDS. This will be illustrated in section 4.1 Table 5.

2.7 Audit Effort

The firm audit variables are reported by AA: WRDS database as noted above on an annual basis as follow:

(i) Audit Fees [*AF*], and

(ii) Non-Audit Fees [*NAF*], and

(iii) Audit Related Fees [*ARF*].

2.8 Scripting of the Principal Hypothesis [*Ho*]:

Using only firms that had a full Panel population so as to avoid an Accrual Bias, we randomly accrued from this set of the S&P500 42 Firms [See the Appendix]; after the 302-classification the testing groups were:

Note the 16 firms where their COSO profile was: {100% *302EIC; No 302MW indications; No 302SD indications*} as [Note this as: $F_i^+ \ i = 1, - - -, 16$]

Note the 26 firms where their COSO profile was: {Not 100% *302EIC; Any 302MW indications; Any 302SD indications*} as [Note this as: $F_j^- \ j = 1, - - -, 26$]

Considering the definitions offered above from the PCAOB/SEC the variable scripted Expectation is:

Test Expectation [Ha] For the 11 accrual years [2005 through 2015: 44Quarters] Firms noted as F_i^+ will have performance ratios: AF/MC that in aggregate will have a central tendency that is Lower than the performance ratio AF/MC for those Firms noted as: F_j^-.

The logic of this expectation was detailed above. The Null of *Ha* is: H_0: There is no counter-directional indication or inferential evidence of no difference between the firm groups: F_j^+ and F_j^-.

3. Vetting and Test Results

3.1 Pre-testing Vetting Protocols

To provide an inferential context for inferential test of the expectation, we will first provide profiles of related variables accrued for the two firm sets: $[F_i^+ \& F_j^-]$. In addition, we will offer a vetting context for the test of the *Ho*. Although this is, in spirt of the logic underlying the Rosenthal (1991) version of Meta-analysis (Note 5), vetting is usually ignored in most statistical studies as from a mathematical perspective the random sample creates, under the assumption of a population that is reasonably non-asymmetric, an inferentially informed sampling distribution thus producing the standard False Positive and False Negative Risk profiles. However, it is nonetheless a productive endeavor to consider the likelihood that the accrual of the sample items happened to be "non-representative". This then is termed: *A vetting test of the accrual*. In this way, the inferential confidence in the results will be bordered on the high side by the standard p-value. Simply, the usual statistical Confidence Levels will be enhanced, a "lower expected p-value" if the vetting provides associational-assurance as to the quality of the representativeness of the sample and so will improve, relative to the computed p-value, the confidence in the inferential generalizations made from the sample. For this vetting and subsequently in presenting the inferential results of this study, we will use the guidance offered by the American Statistical Association as discussed in: Wasserstein & Lazar (2016) and in the joint communication authored by Benjamin (2018) where p-values are the inferential expression so as to permit a more reasoned approach to fixing the inference by the users of the results rather than the producer of the results. For the purposes of expressing the False Negative Error [FNE] and so the Power we will use Fisher's extreme value of 99%.

Consider the following variables where we offer inferential information on the vetting of H_a– the proffered expectation for the two firm sets: $[F_i^+ \& F_j^-]$.

1.   A vetting test of the firm-set ratios for: NAF/MC.

2.   A vetting test of the firm-set ratios for: ARF/MC

3.   A vetting test of the firm-set ratios for the Aggregate: Sum [AF + (NAF – ARF) + ARF] noted as [AGG].

4.   To examine the reasonable or logical overall expectation, we will use vetting tests of the panel correlation-sets for the two firm accrual sets independently in cross-autocorrelation and finally as a Harman (1976) Factor Profile.

3.2 Vetting Profiles: Results

3.2.1 Individual Vetting Profiles

The profile of these related variables is presented in Table 1.

Table 1. Context testing for the principal expectation

	NAF/MC	ARF/MC	AGG/MC
Mean			
$\{F_i^+ \& F_j^-\}$	0.01177% & 0.01999%	0.00488% & 0.00788%	0.07265% & 0.11011%
t (Note 6): p	<0.00001	0.0041	<0.00007
Median			
$\{F_i^+ \& F_j^-\}$	0.00789% & 0.01107%	0.00224% & 0.00262%	0.05593% & 0.06179%
KS (Note 7):p	0.016449	0.18872	0.1381
Inference	Strong Support	Support	Reasonable Support

The results in Table 1 provide strong support for the directional differences that underlie H_a where the AF is benchmarked by the Firm's Market Cap-to wit: The AF should be lower for the F_i^+ accrual group than for the F_j^- accrual group. This is what we find using the p-values in a robust context as a profiler for the three vetting partitions presented in Table 1.

3.2.2 Firm Associational

Longitudinal Vetting: $[F_i^+ \& F_j^-]$ For the AF/MC variable, a reasonable expectation is that there should be pair-wise Pearson Product Moment [PPM] and Spearman [r] association for Firms in the Firm blocks: $[F_i^+ \& F_j^-]$. It would be a troubling result if the blocked-Firm Panel profiles exhibited only random [PPM] & [r] association meaning that the AF/MC variable at the firm level was destabilized over the blocked longitudinal segments to the extent that there was effectively no structural pair-wise association for the AF/MC for the Firms over the Panel blocked by the Firm Groups. This is another way of saying the Fixed Effects nature, logically assumed/demonstrated for firms traded on active exchanges, was not sensitive to the exogenous generating function(s) in the market. See Hausman (1978) (Note 8). To examine this, we have made the following logical assumptions:

1) We have selected a strong measure of Pearson Panel structural association. Specifically, association will be recorded if the pair-wise Pearson association is not less than the Harman (1976) Factor-rotation value of; [(.5) ^.5] or 0.71107 to five places. This Eigenvalue-cutoff means that the (R^2) will be greater than 50% which is a strong test of association. Note Harman qualification as: [Hq].

2) The assumed random pair-wise association Null, that is the test against value, will be 5% of the number of Panel pair-wise associations.

3) The inferential test will be the simple test of proportions z-test for the directional difference between the Observed Proportion and the Expectation using the Normal approximation to the exact Binomial screening using the test of 5s.

In the Panels accrued, there are three Firm-associational blocks yielding the following association-sets: $F_i^+; n_i = [16^2 - 16]/2$, $F_j^-; n_j = [26^2 - 26]/2$ and the Cross:

$F_i^+ \& F_j^-; n_{ixj} = 16 \times 26$.

The Panel Pair-wise block profiles for the principal variables (AF/MC) are presented in Table 2.

Table 2. Harman qualified panel associations for AF/MC

	$F_i^+; n = 120$	$F_j^-; n = 325$	$F_i^+ \times F_j^-; n = 416$
Expected Hq	6	16.25	20.80
Actual Hq	24	65	84
Z: p-value	7.5: p <0.0001	12.4: p <0.0001	7.7: p <0.0001
Inference	Strong Support	Strong Support	Strong Support

In this case, there is a clear evidence that the Null of 5% re: the firm-associations may be confidently rejected in favor of that there is no evidence that the Firm-Blocked panel associations are random-the Null. This is critical because it supports the assumed Fixed Effects nature of the generating processes-suggesting that the ratios AF/MC are likely to be ergodic, at least in a weak sense, and thus that the S&P500 market generating process is likely a driver for both groups. This suggests the tests for the differences in: $F_i^+[\frac{AF}{MC}]$; v.

$F_j^+[\frac{AF}{MC}]$ are not likely perturbed by latent random variables and so biasing the test of Ho to favor the Null.

3.2.3 Vetting Tests on the Full Variable Sets

The results reported for Table 2 are focused on the principal variable: AF. To extend the vetting analysis, we will present information on the associational effects over the individual firm Panel for the variable set:

$$[\forall:\{AF/MC;NAF/MC;ARF/MC;AGG/MC\}]$$

to examine the nature of the linkage of generating process(es) at the firm level over the Panel that impact this full variable-set; this is a logical extension of the vetting of Ha because if the associational Null is the State of Nature, this would then suggest that the firms accrued for testing the principal question of the research, Ha, are atypical of the usual Fixed Effects

generating processes, where logically, there should be associational coincidental movement for, at a minimum, these four variables, $\forall$, controlling for the two Firm blocking factors:

$$F_i^+ [\frac{\forall}{MC}] \ \& \ F_i^- [\frac{\forall}{MC}].$$

Specifically, if the Harman Null were to be the state of nature this would mean that the firm's AIS is so configured that the Audit Fee profile for {AF; NAF; ARF; AGG} were co-independent variables meaning that for each blocked firm set there would be random association for the relationships among the variables {AF; NAF; ARF; AGG}over the Panel. As the ICoFR protocols, as integrated in AIS, are relative stable over the audit year, random association would mean the audit fees at the firm level were not based upon the operational nature of the AIS vis-à-vis the Audit Effort. Random Audit fees billing, if effected by the Audit LLP, would be difficult to defend to management and so is not likely to be consistent with the actual state of nature of the AIS as the firm's information generating platform for firms that survived over the Panel. Thus non-random pair-wise associations of these four Audit Fee variables would be consistent with typical organizations that one would find in the Fixed Effects market trading context and so would rationalize the generalizability of the inference drawn for the analysis of *Ho*. Said from the other perspective if the failure to reject the Null were to be the case, this would call into question the generalizability of the testing results to firms traded in active markets and subject to the usual filing requirements of the SEC.

The simplest vetting test for this expected association would be a Harman (1976) eigenvalue profile using Pearson Product Moment [PPM] associations; for a robustness context, we also will report Spearman associations. Then we will present the Full Rotated Profile. In this case, one can profile the variables in: $\forall$ using their loadings screened by *Hq*. The eigenvalue results, presented in Table 3 are striking.

Table 3. Factor testing of {AF; NAF; ARF; AGG} benchmarked by market cap

Firms as Blocked	$F_i^+ [\frac{\forall}{MC}]$, n =16	$F_j^- [\frac{\forall}{MC}]$, n =26	p-value
First Eigenvalue	3.89 [97.3%][	3.93 [98.3%]	<0.0001 for Both
Range of PPM	[0.92 to 0.99]	[0.96 to 0.99]	All <0.0001
Range of Spearman-r	[0.99 to ≈<1.0]	[0.99 to ≈<1.0]	All <0.0001

3.2.3.1 Discussion

The results are clear. The Null of No variable association of: {AF; NAF; ARF; AGG} as benchmarked by the MC for the two blocked firm sets can be strongly rejected. In fact, the percentage of association explained for only one factor is 97.3% [3.89/4.00]. This indicates

that the all four variables have PPM & r association; these results are consistent with and, in fact, are anticipated by the results reported in Table 2.

3.2.4 The Harman Full Factor Profile

As an elaboration of the results of Tables 2 & 3, it is most instructive to examine the Full Harman Factor profile using as the inference filter the usual Harman cut-off of $[(.5)^\wedge.5]$ noted as: *Hq*. In this case, as the results of Table 3 are basically the same for the Firm-Blocks: $F_i^+[\frac{\forall}{MC}]$ & $F_i^-[\frac{\forall}{MC}]$, the Harman analysis will use the full set of firms. This profile is presented in Table 4.

Table 4. Loadings over the full Harman factor space

Firms as Blocked	Axis A:	Axis B:	Axis C:
AF/MC	**0.74**	0.53	0.41
NAF/MC	0.54	**0.75**	0.39
ARF/MC	0.60	0.56	0.56
AGG/MC	**0.71**	0.57	0.41

The Factors were produced using the standard defaults *SAS™: JMP™, v13: Analysis: Multivariate: Principal Components: {PPM Correlations; Factors [k-1]; Varimax}*. The PPM Correlation range Profile was [0.9592 to .9987]. Loadings > than *Hq* are bolded. These PPM correlations [also the Spearman r values were in the same interval] are consistent with the results in Table 3 and suggest a high degree of association. We took the liberty to name the three Factors using their *Hq*-Loadings. *Axis A*: *Fees Billed in the Conduct of the Audit*; *Axis B*: Fees Billed Incidental to but Generated by the Audit Activity-basically the NAF as noted above, and *Axis C*: Non-Descript-i.e., the rotation Catchall. The named profile is intuitive; it is certainly consistent that AF/MC and AGG/MC load together. Also it is not unexpected that the ARF would be distributed over the Factors with loadings in the mid-range with the upper boarder being less than the *Hq*-value. It is certainly interesting that NAF/MC loads uniquely on a Factor thus rationalizing that the Non-Audit Related Fees [NAF] *are just that* in that they do not strongly co-associate with the other variables. This Named Factor Profile is consistent with the associations presented in Tables 2 & 3 and in that sense, we suggest, should allay any concerns that the accrual of the S&P500 firms was in the rare non-representative sampling zone where one tacitly incorrectly rejects the sampling Null [not the same as the inference Null] and believes firms are representative when in fact they are not. Incidentally, the same Factor profile would have resulted using the Spearman associations. In summary, the inference vetting suggests that: The expected association of the Fees reported is founded in the vetting tests [Tables 2, 3, & 4] and so the firms accrued indeed are a reasonable set from which to draw generalizations from the test of *Ha*.

4. Testing the H_0: The Focus of our Inquiry

4.1 Illustration of Data Formation

For each of the randomly selected firms, n=42, we collected the S&P500 monthly prices for the inclusive eleven-year period (2005-2015). All the firms in the study had reported data for the Panel collected from AA: WRDS & CRSP™. Specifically, this was formed as illustrated following: First, we collected the number of outstanding shares reported by AA: WRDS as of the close of the year. We then took the Geometric Mean of the 12 stock prices reported for each year. Therefore, for each of the firms there are 11 benchmarked values over the Panel, one for each year in the Panel. The variables AF, NAF, & ARF are benchmarked by these Market Caps. For example, consider Ryder, Inc. [R]. This data is presented in Table 5.

Table 5. Illustration of the benchmarking using the market capitalization

Ryder [R]	Geometric Mean	Outstanding Shares	AF / MC	NAF / MC	ARF / MC
2005	39.37158854	61,869,473	0.139579%	0.012316%	0.008211%
Jan	45.55				
Feb	42.46				
Mar	41.7				
Apr	36.93				
May	36.74				
Jun	36.6				
July	38.99				
Aug	35.09				
Sep	34.22				
Oct	39.67				
Nov	42.43				
Dec	41.02				
2006	50.32367583	60721789	0.107993%	0.019684%	0.009818%
2007	50.88020485	58042000	0.118516%	0.027140%	0.020317%
2008	55.84446042	55616000	0.119130%	0.038685%	0.035417%
2009	33.02113876	56051000	0.221518%	0.043304%	0.027014%
2010	41.9609667	51738000	0.165824%	0.055344%	0.041456%

2011	50.4828321	51125000	0.143359%	0.027192%	0.015498%
2012	45.48284698	51112000	0.172064%	0.034490%	0.021508%
2013	61.54759716	52593000	0.126662%	0.024714%	0.009268%
2014	85.27648871	53040000	0.092857%	0.017687%	0.006633%
2015	81.29660124	53425000	0.096701%	0.018419%	0.011512%

Using the information set in Table 5, the 2005 benchmarks for the AF=$3,400,000, NAF = $300,000 & ARF = $200,000 are computed as:

[AF/MC = [$3,400,000] / [39.37158854 $\times$ 61,869,473] = 0.139579%

[NAF/MC] = [$300,000] / [39.37158854 $\times$ 61,869,473] = 0.012316%

[ARF/MC] = [$200,000] / [39.37158854 $\times$ 61,869,473] = 0.008211%

This was the computation used for all the firms accrued and so produced the three benchmarked variables of the study: [AF / MC], [NAF / MC] & [ARF / MC]. Given this illustration, we now present the testing of the principal variable in the study: [AF / MC].

4.2 Précis of the Test of Ho

The accrual of the firms was random and selected from the S&P500 for a full Panel of eleven years [2005 through 2015]. The *a-priori* power was determined on the basis of an equal-split and a pilot-approximation to the overall variance; the power of the standard t-test was on the order of 87%. The retrospective power using the *SAS™.JMP™.v13: Analysis* platform for the results in Table 6 was on the order of 85%. All of the " Effective" & "Non-Effective" scoring information was collected, with appreciation, from the WRDS™ [Audit Analytics™] platform provided by the Department of Statistics of the Wharton School of the University of Pennsylvania.

The Results are presented in Table 6.

Table 6. Principal test profile of *Ho*

Firms Tested	$F_i^+ [\frac{AF}{MC}]$, n =16	$F_j^- [\frac{AF}{MC}]$, n =26	p-value
Mean	0.06088%	0.09013%	0.0003
Median	0.04804%	0.05072%	0.0687

Using the Welch correction for the two-tailed p-value as the standard deviations, in ratio, were on the order of 3 with the larger, as expected, being for: $F_j^- [\frac{AF}{MC}]$. The directional differences are in the expected direction as: $F_i^+ [\frac{AF}{MC}], < F_j^- [\frac{AF}{MC}]$, for the Mean and Median.

The two-tailed p-values are also indicative of a reasoned rejection of the Null. For the Median, we used the distribution free Kolmogorov-Smirnov Two-Sample Test [K-S]. In this regard we took the two-tailed equivalent and so used: D+ =max (F1-F2) + D- =max (F2-F1): where their respective p-value was [0.0137] + [0.055] or 0.0687.

4.3 Summary of the Test of Ho

Considering the confirmatory associational vetting as presented in Tables 2, 3 & 4, the test of *Ho* Table 6 offers a clear result:

There is evidence that suggests that Firms that attend to the COSO imperatives of the PCAOB have a lower ratio of Audit Fees benchmarked by their Market Cap relative to firms that have had COSO issues reported as part of the SEC 10-Q submissions.

5. General Discussion and Outlook

5.1 Discussion

These results are powerful affirmations of the logic of creating a COSO opinion following on the recommendations of the Treadway Commission that management must (i) create a system of ICoFR, and (ii) take responsibility for its functioning in a *Catch & Correct* mode. This research report offers clear confirmation of the PCAOB reasoned presumption that one of the insidious results of the lack of audit attention to calibrating the risk level of the audit depending on the adequacy of management's system of Internal Control over Financial Reporting [ICoFR] during the 1990s enabled, perhaps produced, the control dysfunctions that permitted management to take actions to improve the firm's profitability profile by "whatever means possible". *Flashback*: Initially, firms tried to find "GAAP-Wiggle-Room" by shifting various matching protocols such as Inventory Costing and Depreciation, then to proffering new re-interpretation of revenue recognition "Smoke and Mirrors" defalcations such as the Mark–to-Market proposal of *Enron*. See https://www.investopedia.com/updates/enron-scandal-summary/ Interestingly, such modes of "Creative" Accounting at *Enron* "tacitly" were not flagged by the SEC due to the "presumed acceptance" of these Accounting "Gizmos" by the flagship of the Audit and Assurance LLPs: *Arthur Andersen*™ LLP. Finally, many firms crossed the legal-frontier and began manufacturing erroneous data to "make the numbers" so as to compete in the irrational market trading world created by the dot.coms. See https://www.sec.gov/news/press/2004-148.htm

Yes, indeed, it was the lack of oversight at the SEC and the Audit & Assurance LLPs that almost crashed the world's trading markets. And, also *Yes*, the PCAOB did due diligence and identified the key audit concepts needed to right the Audit and Assurance Ship. Specifically, to:

(i) Expand the responsibility of the Audit LLPs that are auditing firms traded on Public exchanges because trading on Public exchanges charges the Federal Government with the responsibility to protect the Public Good-thus rationalizing the right of the Fed to regulate and licensing the Assurance LLP-to wit SOX[2002].

(ii) Require the Auditor of record to express an Opinion on adequacy of Management's system of the firm's Internal Control over Financial Reporting: the COSO report.

(iii) Require that registrant to have an Audit Committee, charged with Financial Oversight at the firm level, as a condition to listing, and

(iv) Require Management to affirm that the nine PCAOB-Management Assertions as well as the adequacy of the firm's ICoFR have been attended to in creating the publically available information regarding the results of operations during the audit year through the required PCAOC:Sec.404-signings.

Finally, "*en somme*" it is most interesting that the PCAOB elected not to Proscribe what Firms traded on exchanges MUST do re: ICoFR and also did not so Proscribe HOW the Assurance testing would be configured. They created the rule-set of SOX that are relatively "*laissez-faire*". What our research shows is that a heavy regulatory hand is NOT needed to create desirable systemic change.

5.2 Outlook

To enhance the testing protocols to make the decision re: the adequacy of Internal Control over Financial Reporting, we offer that there needs to be a PCAOB study of ways for Management to create adequate evidence on the reasonable assurance that the Segregation of Duties-i.e., the principal feature in the Montage of adequate ICoFR-has been attended to by Management. At this point, the Audit LLPs are NOT permitted to make "consulting" suggestions to the client (Note 9). This regulation derives from the obvious but ignored dysfunctional effect on *Enron*'s Auditors, the Audit-arm of the Houston Office of *Arthur Andersen™ LLP*, caused by the fact that *Andersen Consulting™* was at the same time that the Audit was underway, billing *Enron* for ONE MILLION US dollars a WEEK! (Note 10) HOWEVER, this common sense requirement of restricting the Consulting-arm of the Audit LLP to be engaged by the Audit Client seems to have resulted in a lack of flow of information that would aid the client to better effect enhancements to management's system of ICoFR. Specially, the main issue that deserves study is: *Over the four dimensions Authorizing; Recording; Custody; and Access to IT, the latter is the main issue for management and also for the Auditors*. We propose that a study of HOW to produce a graphical display, in the flowchart modality, of how IT access: Password and FireWalls are distributed in the organization is needed. This graphic would aid Management and also the Auditors to determine where there are possible weaknesses and deficiencies enabled by poor design that create IT lacunas that would likely compromise management's system of ICoFR. One of our German associates who was a manager in one of the Big 4 Audit and Assurance LLPs in the Euro-Zone expressed it as: [paraphrasing in English]:

"The problem that I have with the Segregation of Duties [SoD] is that at the time that SoD became the Holy Grail of ICoFR, circa 2000, access to and understanding IT was not such a big deal. Now I have no idea. As an Auditor I AM not certified to be an IT expert. Most of the various programs that are part of the AIS templates/softwares use various integrated platforms such as: Java, SAP R/3, ASAP, QuickBooks, R, C, C++, and VBA to mention a

few. In my role as the In-Charge or Manager, I needed to call in the Geek-squad to figure out what I have or what I need to see to determine if there is real SoD in the AIS. I needed help because I cannot follow all the coding links to determine where there SoD issues due to inadequate IT-access restrictions. To further complicate the issue, if I call in the Geek-Squad from xxxx.LLP the cost of the budget will likely be out of control. That in a nutshell was my daily conundrum."

Therefore, to address the current and impending difficulties with executing the audit as the IT world evolves with such rapidity that auditors not working in the IT milieu cannot understand if the SoD has been attended to, we propose that a joint commission, populated very much as was the Treadway Commission of the 1990s, be formed by the PCAOB, SEC, and AICPA to aid the Management of the firms traded on active exchanges, their Internal Audit divisions, as well as the Audit and Assurance LLPs with recommendations and hopefully Software that will better allow the IT:SoD to be mapped-a version of a GPS focused on the IT configurations of the Audit client. This is not an unrealistic requirement; Excel™ effectively does this. For example, assume that we have:

$$A1=1, B1=2, C1=3: E1=[A1+B1+C1]$$

$$A2=4, B2=5, C2=6: E2=[A2+B2+C2]$$

If we replace C1 with [E1 + E2] Excel flags this as a circular reference and then produces a graphic with Blue directional arrows from C1 to E2; from E2 to E1 and finally, from E1 to C1 as an illustration of where this configuration does NOT conform to the rules of Addition. This could be the genre of the output for the Mapping Software re: The identification of IT: Segregation of Duties issues. In this regard, in a recent Journal of Accountancy [Tysiac (2019)], Bill Reeb, the new AICPA chairman, is headlined and in a discussion (p.21) notes:

Technology is being developed to handle many of the compliance tasks that accountants have skillfully managed for years. Repetitive tax compliance processes, inventory counts, and confirmations are among the many duties that increasingly are being performed through technological means.

Yes, Bill we agree and we hope that the Segregation of Duties compliance mapping technology is among the developments that the AICPA is considering.

As a final note, we offer the research by Jenkins, Negangard, & Oler (2018) that echoes the discussion of the DT audit in charge re: the difficulty in auditing the SoD dimension of the audit. They offer the following, p.1766:

"- - -, audit firms are increasingly relying on various specialists to help them perform their audits. - - -. Our results suggest auditors are largely relying on forensic specialists to provide them with additional comfort beyond that obtained from traditional audit procedures. Furthermore, our results demonstrate that the usage of forensic specialists occurs primarily on riskier engagements, - - -. Although their involvement varies, forensic specialists assist audit teams by providing both guidance and direct assistance across the audit in areas including fraud brainstorming, design of procedures to test for fraud, and review of results of fraud‒related

testing. In addition, our findings indicate forensic specialist involvement may lead to greater comfort as evidenced by the perceived identification by forensic specialists of additional audit findings related to material misstatements, financial reporting fraud, misappropriation of assets, and internal control deficiencies. Our results also reveal the majority of auditor and forensic specialist participants believe the value of forensic involvement on audits outweighs the associated costs, even in the absence of such additional audit findings.

Given this research report, we suggest that the PCAOB could provide intergovernmental fund-support to the GAO/OMB so that the audit LLPs who are servicing PCAOB risky clients could engage GAO-forensic auditors as outsource partners in the execution of the audit. According to Jenkins, Negangard, & Oler this may improve the quality of the assurance provided to the public and conserve resources-a Pareto effective action.

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Notes

Note 1. See the excellent link http://www.finance-lib.com/financial-term-treadway-commission.html for more information

on the Treadway Commission. A must reading for students in Auditing Courses. In the spirit of the Treadway Commission the auditor plans and performs the audit to obtain appropriate evidence that is sufficient to obtain reasonable assurance about whether material weaknesses exist in ICoFR for the audit year. Interestingly, a material weakness in ICoFR may exist even when financial statements are judged by the External Auditor to not be materially misstated (PCAOB, 2017). This means that the firm could receive an Unmodified or "Clean" Opinion on their Financials-reasonable assurance that the Financials of the firm are free from material error-but that firm could be rated as NOT having an Effective or Adequate system of ICoFR! This is one measure of the "*laissez-faire*" demeanor of the PCAOB.

Note 2. Verbatim:SecuritiesActRelease:[33-8829[sub:S7-24-06:Date:3-August-2007<www.sec.gov/rules/interp.shtml.>

Note 3. Verbatim: Securities Act Release:[33-8809[sub:S7-24-06: Date: 20-June 2007 & Verbatim: Securities Act Release:[33-8810[sub:S7-24-06: Date: 20-June 2007 <www.sec.gov/rules/interp.shtml.>

Note 4. We used the Geometric Mean as it is often used in the financial calibration market variables as it is less sensitive to the second moment variance created by a lack of symmetry than is the Mean but not relatively insensitive as is the Median.

Note 5. For an excellent discussion on Meta-Analysis: Glass, G. (2000): <http://www.gvglass.info/papers/meta25.html>

Note 6. All of the t-tests were Welch-corrected tests as there was consistent evidence that one could reject the Null (at a p-value <0.1) that the Variance/Standard Deviation were the same over the accruals variable groups. Variation group-level differences of course perturb the inference relationals through the Standard Deviation and so the Standard Error of the mean.

Note 7. For a robustness test we used the JMP,v13 platform for the Non-Parametric tests and selected the distribution free Kolmogorov-Smirnov Two-Sample Test[K-S]. The K-S test uses the absolute value of the maximum shift/CC-displacement magnitude between the Empirical Cumulative Distributions [ECD] of the samples to form an inferential test of the usual Null. There is no theoretical reference test-against distribution assumed as there is in many of the alternative tests; for this reason the K-S test has have found inferential currency and has recently been added to the SAS/JMP Non-Parametric platform. Our sample is rather large in comparison of developmental data sets reported in: Justel, Peña & Zamar (1997) and Stuart, Ord & Arnold (1999) and so is an excellent approximation to the large-scale smoothed approximation. We used the KS-test for all the Medians that are reported in this paper.

Note 8. The Hausman (1978) test for firm units in a Panel provides information on the association of the firm model variables and their "unique" errors over the Panel units from the statistical filter created by the Panel Model. The Null is that there are Random Effects-i.e., no specific associations blocked on the Firm-unit. Rejecting the Null produces support for a Fixed Effects alternative suggesting that the firm is characterized by stable model parameters with a firm-unique dummy-variable α-orientation. The tacit implication of rejecting the

Random-Effects-Null in support of the alternative of a Fixed Effect's character of the firm is that the firm's model parameters should be sensitive to the firm's unique generating function as driven by the S&P500's generating function(s). In our context, ALL the firms are in the same S&P500 panel and so in the Fixed Effects context there should be syncretic, short of homomorphic, movement of the firms' unique α-orientations driven by the market generating function(s). This then should produce pair-wise association for the firms blocked as;

$[F_i^+ \& F_j^-]$.

Note 9. True there is the Management Letter-feedback from the Audit Team on issues that have come to light during the audit that is sent to Management. However, to avoid the interdictions of the PCAOB re: the conflict of interest of mixing the Assurance and the Consultation, this letter usually identifies issues and avoids making suggestions as to "what could/should be done" to "correct" them.

Note   10.   See
https://www.nytimes.com/2002/01/15/business/enron-s-collapse-the-auditors-who-s-keeping-the-accountants-accountable.html   and
https://www.washingtonpost.com/archive/business/2001/12/14/enrons-outside-accountants-also-did-inside-audit/42bfe359-5af1-462c-99f6-bedcf5589dd2/?noredirect=on&utm_term=.b6db852c069e for more details.

Appendix

Table A1. Tickers of accruals for analysis

R*	FLR*	DNB*	FDX*	GWW*	RHI*
AME*	NSC*	PCAR*	CMI*	HON*	GD*
NOC*	PH*	MCO*	PWR*	EXPD	UPS
URI	CHRW	ROP	LUV	EFX	SWK
MAS	RTN	CTAS	MMM	LMT	BA
CAT	UTX	KSU	SRCL	DOV	GE
TXT	FLS	PBI	UNP	ITW	SNA

*Indicates: F_i^+; Otherwise: F_j^-.

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