



Audit risk calibration: Extending the Non-GAAP SEC-Filter

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ABSTRACT

AS5[v.Dec:2017] issued by the Public Company Accounting Oversight Board [PCAOB] requires the use of Analytical Procedures [AP] at the Planning and Substantive Phases of Assurance Audits for firms traded on active exchanges. We argue that one aspect of AP, relative to risk-setting, should be vetting the information that is produced/published by the audit client pertaining to Regulation G [v.SEC:2003] called: Non-GAAP information. In our research, we intend to leverage the longstanding Reg[G] requirements to extend the Non-GAAP information to firm performance profiles reported for the Environment, Social, and Governance[ESG]Platform on Bloomberg™. There are two research foci: (1) Offer an AP-Model that uses GAAP & ESG variables to contribute audit evidence useful in making the decision to launch an AP-Extended Procedures examination of the firm's Enterprise Resource Planning & Control [ERP&C] protocols, and (2) Profile a random accrual-set of firms indexed on Bloomberg so as to offer population parameter estimates for refining the AP-Model. The AP-Model is based upon correlational associations for the ESG- & GAAP-variables from the: Income, Balance Sheet & Cash Flow Statements. If there seems to be a disconnect between the nature of these associations for the ESG-variables and those of the GAAP-variables, the auditor may use this as audit evidence in making the decision to conduct an Extended Procedures Examination of the firm's [ERP&C] protocols. As for the other focus, we found that for the accrual of firms tested there is no inferential evidence that the ERP&C-protocols are consistent drivers for both the ESG- and the GAAP variable sets.

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Introduction

The Public Company Accounting Oversight Board [PCAOB] requires the use of Analytical Procedures [AP] in the Planning and the Substantive[Completion] phases of certification audits. As noted by Arens, Elder, Beasley & Hogan (2020)[AEBH]:

“Analytical procedures consist of evaluations of financial information through analysis of plausible relationships among financial and nonfinancial data”. [p.174]

They elaborate on this overview as:

“Analytical procedures are required at the planning phase as part of risk assessment procedures to understand the client's business and industry and to assist in determining the nature, extent, and timing of audit procedures. - - -

Analytical procedures are also required during the completion phase of the audit. Such tests serve as a final review for material misstatements or financial problems and help the auditor take a final “objective look” at the audited financial statements. - - - Analytical procedures performed during the audit planning generally use aggregated data to help understand the client's business and identify areas where misstatements are more likely. In contrast, substantive analytical procedures used to provide audit evidence require more reliable evidence, often using disaggregated data for the auditor to develop an expectation of the account balance being tested.” - - - The usefulness of analytic procedures as audit evidence depends significantly on appropriate comparison data. - - - In each case, auditors compare client data with: 1. Industry data, 2. Similar prior-period data, 3. Client-determined expected results 4. Auditor-determined expected results. [pp. 199-200]

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These AEBH-citations are an excellent summary of the PCAOB rule-set as expressed in AS2[2002] through the various revisions that are now published as AS5[[2007]:v.Dec2017] as pertaining to AP in the audit context. Also see the AICPA(2012) discussion that offers many useful elaborations re: AP in the audit context. It is worth remarking that while AP are discussed in the PCAOB documents and by AEBH there is no “recommended” set of actual statistical, mathematical or data analytics to effect an AP-analysis. This is logical; recall that AP are: evaluations of financial information through analysis of plausible relationships among financial and nonfinancial data. Indeed, and obviously, there are effectively a myriad of ways that AP can be executed in an audit context. In our examination, we will be using the standard Pearson Product Moment Correlation model [PPMC]. This correlation model is simple:

- (i) to understand and so easy to explain to the client, the review partner and, if needed to the PCAOB-review team,
- (ii) and a platform in most all of the data-analytical statistical software readily available. For example, Excel™[DataAnalysis[AnalysisTools[Correlation]]], and
- (iii) and ideal to ferret out associational relationships over datasets such as: Financial & Non-Financial datasets.

The overview of our research is *using the PPMC, as the AP-data-analytic model of choice, we will offer an AP-model to assess the possible nature of the client’s reporting of Non-Financial information vis-à-vis the nature of the Client’s GAAP data as an indication of the need for an Extended Procedures AP-investigation relative to further testing the Client’s (i) ERP&C Model and/or (ii) the adequacy of the Client’s Internal Control over Financial Reporting [ICoFR]. Rationale: If the protocols underlying the client’s ERP&C lead to an adequate system of ICoFR, then these protocol-generating processes should affect both the GAAP information and the Non-Financial dataset in a consistent manner. Therefore, if the auditor finds that the GAAP and the Non-Financial information are not linked in the PPMC-context, this may justify an AP-Extended Procedures examination of the way that the ERP&C protocols are configured or executed by management.*

Following, we will (i) take up the case of Non-GAAP data, the protocol of which, is governed by the SEC under the promulgation: Regulation[G]:2003, and (ii) extend the Reg[G]:Non-GAAP context to Non-Financial data reported **for or by** the audit client,

Major Contribution A Leveraging the recent results of Henry, Weitz & Rosenthal (2019; 2020) on the audit impact of the Non-GAAP information vis-à-vis the risk level of the audit, offer a **AP-PPMC risk calibration model**—i.e., a protocol-set for the use of Non-Financial information in the AP-audit context related to the functioning of the ERP&C protocols of the audit client,

Offer an illustration of the AP-PPMC risk model for Proctor & Gamble, Inc. [https://us.pg.com/.](https://us.pg.com/),

Major Contribution B Create an accrual-set of firms so as to provide population profiles that relate to the AP-PPMC risk model. The accrual-set is taken from the Bloomberg Industrial Classification System [BICS®]-platform of the Bloomberg™ Market Navigation Terminals [BBTs], and

Offer a Conclusion and Suggestions for the further investigative extensions.

Literature review

Overview

Non-GAAP Information: Enhancing Understanding or Tar-Baby Morass

The Launch of Pandora’s WWW-Box

Circa 2000 it was painfully clear that the Public Accounting LLPs had failed to be responsible guardians of the investing interests of the public. The historical backdrop of this fact is interesting. During the 1990s, post the launch of the WWW, and due to the mushroom-like explosion of the *dot.com* sector—the *click-sector*—the survival of many of the traditional well-established market leading firms—the *brick-sector*—was at issue. The brick sector was having difficulty floating IPOs or selling bonds to raise capital needed to realize their projects as the “*surreal*” returns of the *dot.coms* were attracting most of the investment resources. The brick-firms in the trading markets were scrambling to avoid the downward spiral of their stock price/market-cap to stay “*above water*” and ride out the irrational market gains of the *dot.coms*. To do this, they initially began by spinning the Audit and Assurance [A&A] opinions so as to give “*hope*” to the investing public to see the “*brighter-side*” of the audit results and so to “*hang in there with us*”. *Voilà*—birth of the Non-GAAP information or if you will the “*Non-GAAP-Spin*” on the results of the audit certifications required by the SEC. In the “*money talks market-trading-world*” this plea did not seem to work; so the firm claims for the “*good times just around the corner*” Non-GAAP informational-spin offered by the brick-block became more and more detached from the results of the A&A reports. Eventually, the Non-GAAP data became manufactured divisive fabrications completely detached from economic reality and somehow dragged some Audit LLPs into the firm’s “*Dog & Pony Show*”. Case in Point: *Arthur Andersen LLP* [Houston] and *Enron*, Inc.

Given the completely ineffective monitoring and control by the SEC during the dawn of the Internet-era, the US Federal government [after considering nationalizing ALL auditors who were providing assurance information for firms traded in the public domain] opted for the creation of a monitoring for control licensure agency—[PCAOB_i]: HR:3763:Sarbanes-Oxley[30June2002]or SOX:AS2].

Non-GAAP Financial Measures

Wisely, at about the same time that the AS2 became the SOX-PCAOB-Audit rules for traded firms, the SEC also, learning from the excesses of the 1990s, launched Regulation [Gii][2003]. In footnote[10], the SEC notes:

Regulation G and the amendments to our rules are intended to ensure that investors receive adequate information in evaluating a company's use of non-GAAP financial measures. In addition, having earnings announcements furnished on Form 8-K would provide the public a source of reference for obtaining a company's most recent statements regarding its financial condition. Therefore, we believe that the new rules and amendments are in the public interest and consistent with the protection of investors.

We have cited Regulation [G], hereafter Reg[G], in Note[2]. This is a comprehensive document and provides not only background information of the SEC-Rules and Regulations re: Non-GAAP information, but also has detailed examples. We have used this in our Audit and Assurance course and found it to be an illuminating extension of the AEBH text. However, as part of the literature review, we have elected to summarize the essentialities the SEC's [Reg[G]].

The intent of the SEC was to encourage firms to offer Non-GAAP information that would enhance investor understanding of the technical communication of the audit opinions required by the PCAOB; however, the SEC also recognized the possible dysfunction due to the obvious conflict of interest in allowing the CEO or CFO to offer their interpretation [spin] of the results of the audit. Thus, they define Non-GAAP information as a re-calculation of the GAAP reported information that either: Includes certain information usually NOT included under the GAAP-rules of the PCAOB or alternatively, that Excludes certain information usually included under the GAAP-rules of the PCAOB. Further, the SEC indicates that related statistical or operating measures such as Number of Employees are not considered under the Non-GAAP rubric. Thus, the SEC does not consider information such as: The Social Disclosure Score, or Governance Disclosure Score, or The Number of Independent Members of the Board of Directors as are often reported by Bloomberg® as falling under the purview of Reg[G]. Such information is generally referred to as Non-Financial information to distinguish it from Non-GAAP information produced by the firm. However, as a guard against self-serving information-spins the SEC does require:

- (i) that the Non-GAAP information be reconciled with its GAAP-base so that in a transparent manner a possible investor could form a reasonable understanding of how the Non-GAAP and GAAP information are related.
- (ii) Finally, to be clear, the SEC indicates:
Regulation G includes the general disclosure requirement that a registrant, or a person acting on its behalf, shall not make public a non-GAAP financial measure that, taken together with the information accompanying that measure, contains an untrue statement of a material fact or omits to state a material fact necessary in order to make the presentation of the non-GAAP financial measure, in light of the circumstances under which it is presented, not misleading.

It seems that the use of Reg[G] is clearly expressed and has the intent to enable the firm's Auditor and the general public, who are possible owners of the firm through the acquisition of voting stock, to arrive at a better understanding of the performance of the firm. Caveat: We offer these Non-GAAP discussions to underscore that there is more to the GAAP & Non-GAAP world than meets the eye and is often subjective and so subject to management's judgmental interpretation. This leads logically to the research that has examined the "actual" impact of Reg[G].

The Peer-Review Evaluation Reg[G]

There have been two excellent analyses of the likely actual functioning of the Reg[G] since the 2003 rollout. The first is the study of Nichols, Gray & Street (2005); this is the platform for the subsequent studies of the Non-GAAP information milieu. They examined the early impacts and delved into comparisons from the time before the enactment of the Reg[G]; thus, it serves as an excellent historical perspective akin to what we have offered above. Recently, there have been two updates of the Nichols, Gray & Street report offered by Henry, Weitz & Rosenthal (2019 & 2020) [HWR]: Must reads! The HWR studies offer an enhanced perspective after the re-tooling or what is often referred to as the "liberalization of Reg[G] in 2010. HWR (2019: p. 1) note:

There exists considerable leeway in the manner and extent to which companies can report and calculate non-Generally Accepted Accounting Principles (GAAP) earnings. Not surprisingly, non-GAAP reporting standards are a concern for regulators trying to uphold the consistency and comparability of financial reporting.

HWR (2020: p. 60) continue:

Many companies have increasingly turned to the reporting of non-GAAP measures, which fall outside the realm of generally accepted principles and must be reconciled to the more familiar GAAP measures. Proponents claim that non-GAAP measures provide better indications of performance; critics contend that they obscure problems and impede comparability. The authors analyzed a wide array of non-GAAP measures and found that this reporting did provide some useful insights into the companies that used them, but at the expense of clarity and transparency.

They also note (p.65):

Greater audit committee oversight could increase investor trust in non-GAAP financial measures and thwart apprehensions of opportunistic reporting.

The HWR-research report provides an excellent context for our extension to Non-Financial information. We will be offering a study that adds to this exciting, interesting and yes, murky context of the audit.

Major Contribution A: AP-PPMC-Protocol Testing Framework

Overview

Preamble for the Inferential Design

The essential take-a-way from the Reg[G]-details offered above is that the Non-GAAP information MUST be reconciled with the GAAP information from which it is abstracted. Specifically, under Reg [G]: **Section 3 a.**

*General disclosure requirement it is require that there should be: a presentation of the most directly comparable financial measure calculated and presented in accordance with GAAP;*²⁶

The expectation is: If the firm follows the Reg[G] protocols, then that should result in a strong association/correlation correspondence between the Non-GAAP information and the GAAP information from which it was developedⁱⁱⁱ. This IS the inferential domain for the testing that could be used by the auditor.

In our context, we are extending the Reg[G] context to Non-Financial information. As we are interested in the use of Non-Financial information as leveraged from the Non-GAAP Reg[G]-context as it relates to the ERP&C framework of the audit client, we will use this as the focus of our report.

The AP-PPMC Model: The Operational Context

The auditor is charged under AS5 to collect client information principally through pre-engagement walkthroughs [AS5:p.5&p.9] in the service of assessing the relative audit risk of the possible client by inquires through the following PCAOB[¶21A1] & ¶22A1p.12] “audit inquiry layers”:

{Top-Down Approach → Entity-Level Controls→ Management Assertions}.

AEBH, Ch11[342-355], re-context these PCAOB inquiry-sets in the audit context as: Probing the protocolset that constitutes the firm’s ERP&C model as this model directly impacts the adequacy of management’s System of ICoFR. Therefore, a key expectation or assumption for our study is that:

After the walkthrough information-collection-phase, if the engagement is deemed to present an acceptable risk audit and thus, is accepted by the audit LLP, this tacitly justifies assuming that the client is likely to have an effective set of ERP&C protocols and so adequate ICoFR.

Given this expectation and the Reg[G] rule-set for accepted audit clients, the associational links between the GAAP and Non-GAAP variable-sets are likely to be strong as the client’s ERP&C and the ICoFR models should be functioning as expected and so should be the drivers of the GAAP related-variable-set as well as the related Non-GAAP information. In extending the Bloomberg ESG Non-Financial information to the Non-GAAP-umbrella, it is thus reasonable to expect, in an adequately functioning ERP&C context, that the PPMC-associational links between the GAAP and the ESG-information-sets are likely to be high. For purposes of this AP-research protocol, we will set the PPMC-associational coordination expected to be above the classic Harman(1960) factor-variable cut-point. Specifically, using the PPMC, the Factor Loading variable values for the Varimax rotation model that are > than [$\sqrt{0.5}$] will be the dominant variable-loading across the rotated variable-set. This is the case as PPMC-coefficient is the percentage of the variance that one variable accounts for with respect to its paired-variable. Thus if the absolute value of the variable- loading is > than [$\sqrt{0.5}$]—the Harman-frontier-value—then that variable will have the highest loading-value across all of the other rotated factors and thus have the highest explanatory value as the square of this correlation projection will be > than 50%. Note this Harman-frontier-value as: H%. Thus, the AP-model will be noted as: AP-PPMC[H%]. For exposition, all correlations will contexted as the Absolute value of the reported correlation. For example, a correlation of -0.73 and a correlation of +0.73 will both pass the [$\sqrt{0.5}$] –screen and be considered > than H%.

The AP screening information will be used to determine inferentially if there is sufficient evidence that the client’s ERP&C model is NOT functioning as expected over ALL the firm variable datasets: the GAAP & the Non-Financial ESG. The consequence of arriving at this conclusion with reasonable inferential assurance will be to suggest the need to consider Extended Procedures [EP] investigations and/or assurance opinion “qualifications possibly requiring Critical Audit Matter [CAM]-flags”.

The specifics of the AP-PPMC[H%] inferential test-protocol to be used will be detailed in the next section. As an overview, our critical test is:

If the percentage of GAAP-association variables that are > than H% is likely to be inferentially larger than the percentage of the Non-Financial-association variables that are > than H%, then this would raise a possible EP-investigation alert in the audit context.

Rationale This is a strong test as it is directional. Tacitly, we are assuming that there will likely be a high percentage of the GAAP-association variables that are > than H%; thus, the auditor should be concerned if the percentage of Non-Financial-association variables that are > than H% is lower than it was for the GAAP-variables. The reason for this is that assuming a functioning ERP&C model there seems to be an H%-associational disconnect between the nature of the GAAP-information and the supposedly related ESG information. This disconnect, if inferentially significant, would warrant consideration of an EP-investigation. In the audit context, we offer that this test protocol is inferentially conservative re: the False Positive Error [FPE] in the Bayes-sense given that the PCAOB [47A1p.22.] offers: “Generally, a conclusion that a control is not operating effectively can be supported by less evidence than is necessary to support a conclusion that a control is operating effectively.”

The Inferential Context: AP-PPMC Protocol Detailed

The details of the AP-PPMC[H%] Protocol is multi-faceted; following we will examine all of these aspects in their component forms. Then, we will offer an example of the AP-PPMC[H%] Protocol as applied to the Proctor & Gamble [P&G: <https://us.pg.com/>] dataset as presented on the BBTs. After we examine all the component parts of the AP-PPMC[H%] Protocol, we will summarize them using the P&G-example as an illustration. Consider now the narrative of the components of the AP-PPMC[H%] Protocol; these are presented as “stand alone” sections. They will be organized in the P&G-illustration and then the AP-PPMC[H%] Protocol will be presented in outline form.

Component 1: PPMC Expectations re: Sensitive Variables The development of the inferential context of the AP-PPMC[H%] protocol begins by specifying the expectation of the strength of the variable associations for the GAAP-variables and also the Non-Financial-variables. This may be contingent on the nature of the firms in the Industry Group {SIC, or NAICS, or BICS} of interest relative to the audit. As an illustration of the collection of this information, we offer an antidotal and non-random survey of a target of opportunity sample of five colleagues.

We contacted five colleagues, experts in this domain, and with a Skype™-interview engaged in an open-ended discussion regarding their opinions for the following two questions:

Question A: What is your Expectation as to the percentage of PPMC-Associations that are > than the Harman-value[H%] for the usual Sensitive Accounts from the {IS, BS & CF} over a panel from 2005^{iv} through 2017, recognizing that there was likely an Event-corruption due to the *Lehman Bros*™ *LLP* sub-prime debacle of 2008?

Question B: What is your Expectation as to the percentage of PPMC-Associations that are > than the Harman-value[H%] for the Sensitive Accounts from the Panel of ESG-matched variables reported on the BBTs over a panel from 2005 through 2017, recognizing that there was likely an Event-corruption due to the *Lehman Bros. LLP* sub-prime debacle of 2008?

Their responses re: [H%], sometime modified over the course of the Skype, were:

Question A: {65%, 75%, 75%, 80%, 92.5%} Average: 77.5%

Question B: {55%, 75%, 80%, 80%, 85%} Average: 75.0%

Basically, this suggests that the generating function of the selected variables from the GAAP and the ESG:Non-Financial domains is expected to be about the same and exhibit a high degree of association among these variables as blocked. We considered this collegial feedback as vetting information for using the Harman-value: [H%]; specifically, [H%] is not *prima-facie* unrealistic. This is important as we will use [H%] to create the screen for collecting the percentage PPMC information from the firm-datasets. Also interesting, the average of the above feedback could be used to benchmark the level of PPMC-associations that should be consistent with a well-executed ERP&C-protocols that would in turn underlie a well-developed system of ICoFR.

Component 2: The Set of Accrual Firms For executing the AP-PPMC[H%] Protocol, it will be necessary to download the GAAP and related Non-Financial data from an indexed dataset platform. There are many such download sources—some of the leaders are: CRSP™, COMPUSTAT™ & Bloomberg™. We have used all three and they are all accurate, reliable and have well organized GUIs. Our only experiential recommendation is that switching download sources during the execution of a particular AP-PPMC[H%] Protocol can create problems with data-organization in particular if there are VBA-hardcoded Marcos that will be used in executing the AP-PPMC[H%] Protocol. For example using COMPUSTAT™ for the GAAP-variables and Bloomberg for the Non-Financial-variables may invite inferential difficulties.

Component 3: The Set of Sensitive Accounts We define a sensitive account in the GAAP-context as: Any account from the Financials of the firm, the information of which, is often used in the analysis of the market performance of firm. Using this definition as context, we recommend selecting a member of the Audit team with expertise in: Accounting, Finance, or Market Analyses to select the Sensitive set of GAAP-variables. After these variables are selected, the selected variable-set should be passed to other members of the Audit Team for their feedback and then finalized.

The same protocol as used to select the GAAP sensitive accounts is used to select the sensitive accounts for the Non-Financial variable-set. The definition of a Non-Financial sensitive-variable/account is that the Non-Financial-variable is consistently collected, “verified”, and reports information on the impact of the firm’s activities on the Stakeholders of the Firms re: the Environment, Social, or Governance profile of the firm. This information is available from many sources. However, our experience is that it is important to collect this information from a single source that is coordinated with the collection of the GAAP-information. One source that seems to be the leader in this reporting is Bloomberg. They note :

We began providing ESG data for companies on the Bloomberg Terminal a decade ago. In the years since, interest in this data set has surged as investors have realized that these areas can have a material impact on businesses and drive value within their portfolios. Today, it is clear that markets have an important role to play in building a sustainable world — from financing a low-carbon economy to shaping how human capital is viewed — and that these markets, and their critical players, need detailed and reliable ESG data.

Component 4: The Association Measure As developed above, the Harman measure [H%] pertains to the Pearson Product Moment [PPMC] for datasets. Caveat: There is likely to be Panel-autocorrelation for these market trading datasets as they are most certainly, in the main, characterized by Fixed Effects in the trading population. Thus, in this case, as discussed with our colleagues who provided their expectations, it is likely that the PPMC are biased to the high-side due to the fact that the Panel autocorrelations are likely to have AIRMA-transfer functions parameters for which the individual-test Nulls could be rejected. However, the Panels may also be slightly corrupted by a lingering *Lehman Bros.*-effect; thus, these two factors statistically may be offsetting re: their effect on the associational measure and thus the H%-measure is, more or less, not likely to be inferentially biased. Further, we did not test the Panel datasets for Winters’ Seasonal/Cycles as the Panels are annual data effectively ruling out Winters’ seasonality that would likely produce lower PPMC scores. However, for our study we did scan the accrued datasets visually and there were no marked seasonal/cycle effects.

Component 5: Recommended Random & Market Price Screens—The pre-test for Structure To give a context to using the percentage of pairwise PPMC-correlations that one could expect, we created information as to the number of H% that are produced randomly. In this context, we assumed that there were 36 variables to be tested; this is the high-end number that we had in the actual study. We then generated random variables using the Excel-codex: [RANDBETWEEN(-100,100)/100] for the actual recorded PPMC-value. We then created the PPMC-matrix and measured the number of informative pairwise correlations > than H%. We iterated this seven times. This created 4,410 $[(36^2 - 36)/2 * 7]$ pairwise values for which 51 were > than H%. The 95% CI of this experimental-Random set was: Mean: 1.16%: [95% CI: [0.84% to 1.47%]]. This means, with a high degree of confidence, that in a random dataset about 1.5% of the values will be > than H%. This random test info-set is important as there is no standard Null other than the Null of NO pairwise correlation. We will use this Random information in discussing the results of our analyses of the firm accruals. We also measured the Market trading price relationships for a one & two lagged PPMC-structure. IF we found for the three possible lags for: Panel[2005:2017] & {Panel[2006:2018] & Panel[2007: 2019] that these three PPMC-lags were of the nature that more than one lag was \leq than H% then that the entire dataset would be excluded from the analysis. Rationale For these accrual Panels it would be the usual characterization that any lags that were not H%- associated would be a rare and so atypical or could represent and outlier result. If there were to be more than one of these lag anomalies, this would suggest a high degree of Panel instability [A Non-Ergodic Panel in the first two moments] and thus would not likely be a representative test unit and so would be best excluded.

Component 6: False Negative Error; OCC Profile & Sample Size Calibration. As for the False Negative Error [FNE—i.e., there is association and we have an indication that that is not the case] concern, we recommend the Operating Characteristic Curve [OCC] that is the standard for the judgmental selection of a rejection region not fixed at a particular p-value. See: Tamhane & Dunlop (2000, p.215). We are offering this as a pre-screen for the Null Profile for various test parameters that can be used in an *a posteriori* context to better understand the nature of the inference. This brief contexting of the study FNE-Profile will economize the presentation for the results where we will be reporting only the usual False Positive Error [FPE] test results. The details of the OCC-analysis and the related sample-size calibration will be presented and detailed in the P&G-illustration.

Component 7 The Screening Triage This is the organization of the inferential information that will be the output of the AP-PPMC[H%] Model. This output is conditioned and also contexted by information in the other six-components above. The AP-PPMC[H%] Model signals are formed following this component. The various decision-points are Terminus-Screens in nature. This means that the InCharge continues to use the AP-PPMC[H%] testing frame only under certain conditions—until the last screen is executed.

Principal AP-Testing Variables The measures of interest are the coordination or PPMC-association of the various key performance indications over the GAAP and Non-Financial domains. We will measure the percentage of pairwise PPMC-associations that are greater than the Harman-measure: H%, for three datasets {A:B&C}:

A: The Percentage of GAAP-Associations that are > than H% within the GAAP-PPMC-matrix: This variable is noted as GAAP%[>H%]. Note: As there are three financial statements there is a choice (i) to have a strong test of association, or (ii) a less stringent measure. We elected to use the strong test. In the practical case, the choice between the two over time, as a rolling benchmark, is not likely to create a variance in the EP-alerts as benchmarked. The strong measure that we used in this study is to count the H%-within occurrences individually for each of the three financial statements. Theoretically, blocking the three financial

statements as separate variable-tests seems the most defensible as it is not unusual for Discretionary Accruals to be used to manage the BS & IS & CF variables and these could, though we suppose not likely, create within variable association but not intra or Cross-variable associations over the three financial statements. This means that we will not measure the Cross-associations [$>H\%$] over the three financial statements. The other or less stringent measure is where the summation will be over all of the association as crossed—i.e., the full un-blocked set of intersections.

B: The Percentage of ESG-Associations that are $>$ than $H\%$ within the un-blocked ESG-PPMC-matrix: This variable is noted as $ESG\%[>H\%]$. Blocking the ESG variables is impractical as for each of the firms there are often different measures reported by the BBTs even controlling for industry-grouping.

C: The Percentage of ESG&GAAP-Associations that are $>$ than $H\%$ within the PPMC-matrix for the Cross of the ESG&GAAP variables: This variable is noted as $ESG\times GAAP\%[>H\%]$

1) Initializing Screens There are two basic screens in this phase; the first tests if $\{GAAP\%[>H\%]$ and $ESG\%[>H\%]\}$ and the Percentage of PPMC[$>H\%$]-associations for a Random Panel is such that the RHS-directional FPE-Null can be rejected at a reasonable level of confidence for both the $\{GAAP \& ESG\}$ test sets. If this is the case, then this suggests that the Percentage of PPMC[$>H\%$]-associations is greater for both the GAAP & ESG datasets than that from a random set of information. If the Random-Null is not rejected, the testing is terminated—as the datasets are likely random. If the Random Null is rejected, the InCharge proceeds to the next test to determine if the Panel fits the usual market-characteristics of a Time Series from a Fixed-Effects generating process. In this case, if there were to be two- or more PPMC[$>H\%$] indications for the Market-Price three-lagged screens, then this would argue that the Time-Series is, reasonably Ergodic, as expected for traded organizations. If one rejects that the Time series is Ergodic, then again this would be an AP-terminus point. In either of these cases, where there is a terminus point, this would be strong evidence that AP-Extended Procedures are needed as the Panel dataset seems inconsistent re: most traded organizations—i.e., this is an extreme case. If neither terminal point is reached then, the InCharge will proceed to the Second-Screen: Balance following.

2) Second AP-Screen: Balance-Test The operative AP-assumption to launch an EP investigation is that overall the percentage of PPMC[$>H\%$]-associations among the GAAP variables is inferentially greater than that for the ESG variable—i.e., rejection of a Percentage Balance tested directionally. If this is the case, then THIS indication alone could be used as a possible ERP&C-disconnect and merit an EP-investigation. Rationale For firms traded on major exchanges and so listed on the Bloomberg terminals, we expect *a priori* and *prima facie* that such firms will have a well-designed ERP&C model consistent with an adequate System of ICoFR. In this case, it is reasonable to expect that there would not be an inferential difference between $ESG\%[>H\%]$ and $GAAP\%[>H\%]$. IF this is not the case, in the expected direction—i.e., the percentage of $>H\%$ -associations is inferentially lower for the ESG-variables—then the InCharge may, acting on this variance from the expectation, be motivated to launch an EP-investigation re: the nature of the variable-set differentials to better understand the functioning of the ERP&C model of the firm given this differential result. This then would be a terminal-point.

3) Final Screen: Conditional Screen: Assume that the $ESG\%[>H\%]$ and the $GAAP\%[>H\%]$ have “about the same percentage—a FPE p-value $< 25\%$ ” of $>H\%$ -associations within their variable sets. In this case, the directional difference between $ESG\%[>H\%]$ and $ESG\times GAAP\%[>H\%]$ can be a reasonable indication of a strong test of an associational ERP&C-dysfunction. Rationale: If there is a high degree of association among the ESG-variables and among the GAAP-variables, AND the association between $ESG\%[>H\%]$ and $ESG\times GAAP\%[>H\%]$ is in the same high-range, this would be a strong indication that the firm’s ERP&C model is likely to have been very well designed thus creating an adequate System of ICoFR applied over the Non-Financial and the GAAP variable domains. Simply: All the firm’s variables, some in the Financial-domain and some in the GAAP-domain, are moved by the firm’s generating function(s) in relative unison. However, if there were to have been relative very few Cross associations—i.e., where there is not a strong set of associations between the ESG and the GAAP variable sets, this would be a strong indication that there could be a disconnect between the Non-Financial profile and the GAAP profile as the ERP&C-model seems to be being applied differentially between the Non-Financial and the GAAP variable domains. Thus the Final testing context is directional where the EP concern is that $ESG\times GAAP\%[>H\%]$ is inferentially less than that of $ESG\%[>H\%]$. This is the last terminal point and so ends the AP-PPMC screening.

The Proctor and Gamble [P&G] Data-Panel: Detailed Aspects of the AP-PPMC[$H\%$] Model

Context Recall that the focus of the study is to evaluate the possibility of using the Non-Financial information provided by the BBTs: ESG platform to form a defensible opinion of the functioning of the ERP&C model as it pertains to the testing of the “COSO” dimension of the audit re: The adequacy of Management’s Model/System of: ICoFR. The critical inferential issue for this study, as motivated by the results reported by HWR re: the Non-GAAP impact on the audit, is the following Study Focus Question reiteration:

To what extent are firms reported on the Bloomberg Terminals characterized as having an associational disconnect between their ESG: Non-Financial profile and their GAAP-profile? Investigation Rationale Recall circa 2002 both the PCAOB and the SEC were reacting to the unfortunate and not infrequent use of Non-GAAP information in the 1990s to obfuscate the operational reality as reported by auditors of firms traded on exchanges. Further, this tendency may still exist according to the HWR reports (2019 & 2020). Thus, we are very interested to determine if the tendency to “Inappropriately Spin” the audit results using NonFinancial Information also lingers on. This would be valuable AP-

substantive phase information that could impact the decision to use EP to investigate the functioning of the ERP&C model as it impacts the adequacy of the client's System of ICoFR.

Caveat This AP-PPMC[H%]-association protocol is a pre-screen to be the first or early indication to consider that an EP-examination may be warranted. This means the InCharge will be required to process the AP-PPMC[H%] Associational alerts along with other indications to form an action plan for the AP-PPMC[H%] investigation of the COSO-dimension of the audit. The AP-PPMC[H%]-alert profile is then an early, perhaps distant warning, that there may be issues that need to be considered relative to the COSO-SOX 404-opinion that speaks to the adequacy of the client's ICoFR. The best way to understand the AP-PPMC[H%]-protocol's impact on the audit is with a detailed illustration.

The P&G Data-Panel: Forming the AP-PPMC[H%]

AP-Audit Context for P&G Assume that the InCharge has established/collected the expectations for the likely PPMC-associations as was done in Component 1.) so that H% seems reasonable. The next general information to be created is the OCC: False Negative Error [FNE] Profiles and Sample Size for the P&G audit engagement.

The OCC-FNE Screen: Point of Information The reason that the OCC is a very useful inferential indicator is that in the best practices world of statistical analysis the FPE and the FNE are both useful information. However, after the FPE is produced this may likely anchor or condition the actual FNE information as it would not have been developed *a priori*. Further, the OCC can be used iteratively by those interested in the error context of the testing; whereas, the single FNE produced after the study is executed is less rich. For these two reasons, we prefer to create the OCC before the testing phase—that is, at the Planning Phase. For P&G, we proffer that if the actual population percentage of PPMC[>H%]-associations for any correlation Panel-test-Block were to be no larger than Ho = 15%, then this would suggest that the variable PPMC-associations were not sufficiently coordinated over that Panel to be consistent with the expectation that the Firm had “Adequate Control over Financial Reported[COSO:SEC 404 Internal Controls :Screens] as expressed through the firm's ERP&C model. As the tacit *a priori* minimal judgmental rejection point, we selected [Ho+10%], this is often the directional variation used in the OCC-curve analyses. In this context, we selected as the maximal toggle-point: Ho =15% for the PPMC[>H%]-associations and so for the rejection of Ho, we selected Ha =25%—i.e., minimal judgment rejection point. In this case, the OCC[FNE[Ho]] curve for any test-block would be:

$$\Phi[\text{OCC}[\text{FNE}[\text{Ho}]]: [25\% - \mu]/\sigma]$$

Where: μ represents the selected test iterations of the percent of a PPMC-variate, σ represents the standard error scored as the Average of {Ho & Ha} for a sample size of PPMC-associations for the ESG- or the GAAP-variables assuming 15 ESG- or GAAP-variables; this would create $105 (15^2 - 15)/2$ PMM[H%] possible associations. We arrived at 15 after inspecting different random samples of ESG- & GAAP-variables for firms in BBTs. In this case, σ was 0.039; thus, the FNE using the usual OCC starting point of Ha = $\mu = 25\%$, we find the following projected FNE_{svi}:

Table 1: Study OCC Projection Context for the ESG-Platform

$\Phi\text{CC}[\text{FNE}, \mu]\text{Projected}$	μ
50.0%	25.0%
26.1%	27.5%
10.0%	30.0%
2.7%	32.5%
0.5%	35.0%

Discussion: In this case, for the pre-analysis decision, it is very clear that if the expectations of our colleagues are founded at even about 50% of their average expectation of 75%, then there seems to be little FNE-risk for the proposed study thus rationalizing the effort to conduct the analysis. Further, after the study is completed the OCC can be “visually” iterated to better understand the FNE vis-à-vis the FPE.

Sample Size: Considering the FNE & FPE We use the standard sample size calculation to form the sample size test value (Tamhane & Dunlop (2000, p.306)); this will allow us to form a comparative calibration of the FNE balanced with the FPE. This is done as it is usual to have a “calibration-benchmark” for the relative FNE. In this case, the suggested sample size for directional values of: FPE(α -value) at 5% and power (1- FNE) of 85%, for the OCC parameters of Ho = 15% and Ha of [Ho+10%] we have the following calculation:

$$\text{Sample Size} = [(1.645\sqrt{15\% * 85\%} + 1.036 \sqrt{25\% * 75\%}) / (\text{ABS}[15\% - 25\%])]^2$$

In this case, the conditioned sample size is 108. This is close to the sample size of the modal case for the ESG platform noted above of 105.

PPMC-GAAP Variables The next set of information is the variable-set of ESG & GAAP variables. For this study, we used the BBTs. The GAAP-variables are drawn from the Income[GAAP], Balance Sheet[Std] and the Cashflow[Std] Statements. The protocol that

we used is discussed in Component 3.). One of the coauthors, who is certified as a: CPA, CMA, CFE, CIA, CFF, CAMS, CISA, CIPFA & FHEA made his selection of the sensitive accounts. These selections were then passed to one of the other co-authors. One performance measure was added—the Quick Ratio. Then these were passed to the third author who affirmed these selections to be sensitive and important measures consistent with the detection of associations. This resulted in 15-GAAP variables taken directly from the BBTs for the P&G:Panel as presented in Table 2.

Table 2: GAAP-Sensitive Blocking Variables as Selected for Testing in the AP-Context

Income Statement, n=5	Balance Sheet, n=6	Cash Flow, n=4
Revenue	Total Current Assets	Cash from Operating Activities
Gross Profit	Total Noncurrent Assets	Cash from Investing Activities
Operating Income (Loss)	Total Current Liabilities	Cash from Financing Activities
Pretax Income	Tangible Common Equity Ratio	EBITDA*
Net Income Avail to Common, GAAP	Current Ratio	
	Quick Ratio	

*Note according to the SEC[Reg[G]] EBITDA is one of the Non-GAAP measures. We included it as it is often reported by most firms and thus is often “reconciled” to the GAAP profile.

P&G ESG Datasets For the P&G ESG Dataset, we are extending the Reg[G] context to the Non-Financial information. As we are interested in the use of Non-Financial information as leveraged from the Non-GAAP Reg[G]-context as it relates to the ERP&C framework of the audit client, we will use this as the focus of our report. We have selected the BBTs as Bloomberg has been the global leader for decades and they offer the two datasets that we will use in the AP-tests of the nature of the adequacy of the ERP&C and its related ICoFR. Specifically, the BBTs offer access to: (i) populated GAAP platforms for: The GAAP Income Statement, The Standard Balance Sheet, and The Statement of Cash Flows, and (ii) a very rich set of NonFinancial platform called the Environmental, Social and Governance platform [ESG]. For the P&G case, we selected variables that were fully reported for the panel—i.e., NO missing data in the Panel. This was our accrual selection protocol for ALL 15 firms in the accrual-set; if there was any missing values, we excluded that variable. Usually for the firms for the ESG-platform of the BBTs there were 12 to 18 variables that fit this accrual criterion. For the P&G, we use the following ESG: variables [In Table 3 these are the exact titles reported in the BBTs]:

Table 3: ESG BBT Full-Variable Set Used for P&G, n=18

ESG Score	Disclosure	Environ Disclosure Score	Total Emissions	GHG	Energy Consumption	Total Water Use	Hazardous Waste
Total Waste		Num Environ Fines	Environ Fines Amt		Social Disclosure Score	Number of Employees CSR	Governance Disclosure Score
Board Size		Independent Directors	PCT Independent Directors		Board Duration	Board Meetings Per Year	Board Meeting Attendance

There are three inferential testing groups configured for the AP-PPMC[H%]. These are Staged-Terminus testing phases; this means if, at any stage, it is the case that there is a dysfunction, the analysis is logically terminated.

Testing Phases of the AP-PPMC[H%] for the P&G Audit

Random & Ergodic Characterization: First Screens X the test for Structure In Component 5.) we have detailed the computation base for the Random & the Ergodic screens. For P&G In this testing case for the ESG & GAAP datasets, both test p-values for ESGv.Random and GAAPv.Random were <0.0001; specifically, the H%[ESG] was 15.03% and the H%[GAAP] was 35.45%. Clearly, this strongly rejects the Null that the associational Datasets for the ESG and GAAP were generated by random processes in favor that the generating processes have structural components. Tacitly, this is expected as P&G has been a traded firm for many years and had no 404-Disclosure flags and was rated as having an ICoFR for which the SEC-reported designation was ISEFFECTIVE^{vii} as per the AuditAnalyticsTM. In the case for P&G, we now move testing the price-lagged variables.

The market trading price as reported by Bloomberg for P&G was collected from 2005: 2019. These prices were used to correlate two lags thus producing three correlations. The Lagged Panels, n = 13, were: [2005:2017] & [2006:2018] & [2007:2019]. We expect that if more than one of these three lags are less than the H%-cut-point, then we will not use that dataset in the testing. We reasoned that if there is an instability in the short-term horizon price lags that the dataset would not be stable in the usual Fixed Effects context and so may not provide useful information. We deem that this screening test is a prudent way to guard against a pronounced *Lehman Bros.*-Event that could create a long term instability in the price structure. In the P&G case, the price correlation profile is:

84.1%[2005with2006] & 80.8%[2005with2007] & 73.0%[2006with2007]

In this case the P&G passes the Market Price screen and we can thus move on the AP-Associational Analysis.

The next step was to form the PPMC-set and compute the performance variables as noted above.

In this case, for P&G there were 18 ESG-variables Table 3 & 15 GAAP variables [See Table 2: 6 BS-variables & 5 GAAP-variables & 4 CF-variables]. For each of these 33 variables there were 13 measured variables over the time period. This gives a RC-Matrix of: of 429 measures [13 ×33]. This produces a correlation table of PPMC-values used in the AP-protocol of: 184 [∑ [(xi)^2 - xi]/2 i:1-4]; where i: 1=ESG, 2=BS, 3=IS & 4=CF re: the elements within.]

The Three Computational Screens: The Core AP-PPMC[>H%] Testing Values The Balance Test The Percentage of ESG Associations that are > than the Harman-measure within the PPMC matrix is noted as ESG%[>H%]. In this case, we will present the computations as an illustration.

There are ESG 18 variables. This means that there are 153 ESG PPMCs. [(18^2 - 18)/2]. This is the ESG sample-accrual. In this case, recalling the absolute value context for reported correlations, there were 15 PPMC > (√0.5) and 8 that were less than (-√0.5) or 23 ESG-PPMC in total that were > H% or “High” PPMCs. This gives as the average 15.0% [23/153] and the 95%CI for this is: [9.4% to 20.7%]. For example, the Standard error is:

$$\sigma = 2.9\% [(((23/153) \times (1 - (23/153)))/153)^.5]$$

Thus the 95%CI are [23/153] ± [1.96×σ] and we have for the within ESG-variable-set:

$$\text{ESG\%[>H\%] Mean: 15.0\% with 95\%CI: [9.4\% : 20.7\%]}$$

The GAAP Component The Percentage of GAAP Associations that are > than the Harman-measure within the PPMC-matrix as blocked over the three financial statements is:

$$\text{GAAP\%[>H\%] Mean: 35.5\% 95\%CI: [18.6\% : 52.3\%]}$$

The Cross Component The Percentage of ESG×GAAP Associations that are > than the Harman-measure within the PPMC-matrix for the Cross of the ESG&GAAP variables is:

$$\text{ESG}\times\text{GAAP\%[>H\%] Mean: 7.8\% 95\%CI: [4.6\% : 11.0\%]}$$

Discussion P&G Impact Analysis:

Second Screen: Balance Using the above information, we know that these datasets are generated by structured components—i.e., not random as the 95%CI for the random set does not contain the lower limit of the 95%CI of any of these three datasets. Additionally, as presented above the market price Panels for P&G may be characterized as Strongly Ergodic as the lags are all >than H%.

Next, from the perspective of P&G, InCharge will proceed to the AP-Associational Impact Analysis:

The first issue of note is: There is a suggestive difference in the EP-test-direction in the percentages of the ESG%[>H%] v. GAAP%[>H%]. Specifically,

the former was: ESG:Mean:15.0% and the 95%CI: [9.4% : 20.7%], and

the latter was: GAAP:Mean: 35.5% and the 95%CI: [18.6% : 52.3%].

The ToP: directional p-value for the Mean difference using for all tests the Non-Pooled[σ] is: p-value <2%].

AP-Impact Prudence, and of course recognition that AP-Investigations consume audit resources, would likely dictate that there could/likely be a disconnect in the ERP&C as the percentage of associations above are relatively different, and re: the directional testing context, the ESG-associations are inferentially lower than the percentage of GAAP-associations. Further, perusing the OCC [Table 1] only the GAAP has a FNE that clearly suggests a rejection of Ho, [Specifically, the OCC table: FNE for the GAAP-set is on the order of >50%]. This adds to the likelihood that an EP-investigation may be warranted.

In this context, the AP-associational analysis would likely have reached its logical terminus; and for this reason, the InChagre may well examine the nature of the Non-Financial and the GAAP associations to focus an EP-investigation of the client’s ERP&C and ICoFR models.

For purposes of illustration ONLY, the Conditional analysis would be instructive. For the Cross-test: ESG×GAAP%[>H%], we find that for this Crossed data the percentage is:

Mean: 7.8% 95%CI: [4.6% : 11.0%].

The operative p-value for the Mean difference: **ESG×GAAP%[H%=7.8%] v. ESG%[H%=15.0%]** is <2.0%

This p-value is not surprising as the mean values of associations falls by about 50% at each ordered step: {35.5% : 15.0% : 7.8% }. In this Conditional Phase, given that the ESG-variable set has a larger percentage relative to the Cross that has the smallest, this information would likely weakly suggest—recall that we have terminated the P&G-testing at the Balance stage—a quizzical uneasiness relative to the quality of the ESG connection with the ERP&C protocol set. Indeed, this would be confirmatory to the first

result presented above. This may logically act as a reinforcing aspect to the initial AP-suggestion of an interesting difference between the percentages of the ESG and the GAAP measures. One final aspect is the nature of the FNE: through the OCC analysis. The ESG and the ESG×GAAP test-blocks are below the FNE-screen[Ho+10%], thus suggesting a very high likelihood that the state of nature is in the Ho zone—i.e., so further reinforcing the need to conduct an EP-set of queries. The summary for P&G is clear: Using the AP-PPMC-Associational Protocol and given that in the past there was no negative COSO-404 indications as indicated above, it is not unwarranted to consider, at some point, an investigation of the ERP&C model as it impacts the COSO Opinion re: the adequacy of management’s System of ICoFR. Specifically, for P&G

1. The P&G series are not likely generated by random processes,
2. The P&G series seem to be drawn from a population set of Ergodic Market firms,
3. The OCC indications for the ESG[15.0%] as well as the Cross[7.8%] are in the high FNE-zone,
4. The Balance screen of: ESG%[H%=15.0%] v. GAAP%[H%=35.5%] has a p-value < 2%, This would be Terminal Point and an EP-investigation would be considered, additionally
5. The Conditional screen ESG×GAAP%[H%=7.8%] v. ESG%[H%=15%] has a p-value of <2.0%

Discussion The OCC indicates that the FNE at $\mu=22\%$ is 80% and at lower μ -values is >80%; given that the mean levels for the P&G are: {35.5% : 15.0% : 7.8% } prudence would dictate that Extended Procedures may need to be considered given the FNE profiles of ESG and the Cross. Further, there is a disconnect at both (i) the Within-stage [15% v. 35.5%] and, (ii) the Cross-stage [15.0% v. 7.8%] strongly suggesting consideration of an EP-Investigation. All of this AP-Associational Protocol information would, of course, be recorded in the working papers and also saved in the permanent-file for the P&G audit. Now that we have illustrated the details of the AP-PPMC-Associational Protocol, we will consider the population parameters from a set of firms randomly select from the BBTs.

Major Contribution B Inferential Profiles: The Accrual Datasets

Overview

Using the John and Diane Connors Bloomberg Terminal [BBT] Lab of the SBE; SUNY[Plattsburgh], we randomly selected from the BICS: the Firm Block: Consumer Staples: [Consumer Products[Household Products]]. The selection was made and all data was collected the week of 3Feb2020. There were 790 firms in this final group. We selected three Market-Cap partitions: {100Billion: 55Billion and 10Billion}. We randomly selected five firms from each of these three partitions. These 15-firms are noted in the Appendix. We then researched these 15 firms to determine if they had been suspended from trading or had been required to re-file any of the SEC-filings during the Panel time period 2005 to 2019. Using the WRDSTTM[AuditAnalyticsTM [Wharton®] data source and the SEC filing reports from the BBTs, we found no indications of trading suspensions or GAAP-related re-filings voluntary or required during the Panel period. Thus there is no information to suggest that these firms are failing to reasonably manage the resources committed to their charge re: the ERP&C model and thus have adequate ICoFR.

Population parameters

The following information provides an important context for further use of the AP-PPMC[H%] protocols as this is the first set of generalizable information that has been produced on the associations between the GAAP and the Non-Financial information. Caveat These 15 firms were random accruals from the BBTs. However, they were fixed in only one of the ten-BICS industry portals: Consumer Staples: [Consumer Products[Household Products]]; thus, their generalization may be limited. The accrual profile information is the percentages of the pairwise-PPMC for the three Blocked Study-Arms where n =15; it is presented in Table 4 following:

Table 4: Accrual Profiles and 95% CIs

	<i>ESG%[H%]</i>	<i>GAAP%[H%]</i>	<i>ESG×GAAP%[H%]</i>
Mean:Median	17.2%:16.2%	44.3%:45.2%	17.6%:14.9%
95%CI	11.9% to 22.4%	37.9% to 50.7%	11.7% to 23.5%

Discussion of Accrual Results

We present this data as aggregated over the three accrual Market-Cap blocks: 100B: 55B: 10B. Rationale When we tested these PPMC-associations using the Welch-corrected variance ANOVA, the Tukey HSD[$\alpha=0.05$] test, and the Wilcoxon multiple-comparisons test there were no cases where the Market-Cap blocking produced interesting inference differences. The overall p-values for the ANOVA and the Wilcoxon/Kruskal-Wallis tests were 0.70 suggesting that Market-Cap was not an inferentially important blocking variable. Given this result, we only will report the three principal blockings as noted in Table 4.

Randomness & FNE:Panel-Tests The first important information is that all 15 firms passed the Market Price Screen; also, we were able to reject the Null of randomness in favor of non-random generating processes. This is to be expected as argued above for the P&G dataset. Further, using the OCC-screen[Table 1], the FNE, for the GAAP-variables is overall very low as it was for the P&G profile; however, the FNE is relatively high for the ESG-variables. This suggests an association disconnect for the GAAP with respect

to the NonFinancial dataset surrogated by the ESG-data. This is consistent with the HWR-research report and the P&G analysis. Summary Insights ERP&C & ICoFR Screening We tested the relationships in Table 4 parametrically and also, in the service of robustness, using Non-parametric tests. For testing^{viii} we used the standard One-way ANOVA-layout [n=3]:

1. An interesting vetting result was that the Welch-test for variance anomalies for all four Screens had p-values > 0.5. This is a strong indication that the PPMCs over the blocking-variables [ESG:BS:IS&CF] were not inferentially differentiable in their second moments; this lends credibility that the H%-screen was not asymmetrically conditioned by the blocking variables so that were vetted as uniform in that sense.
2. Using the standard testing overall-platforms, one may confidently reject the FPE-Null for the Mean/Median results between the ESG and the GAAP. The two p-values for the overall tests were <0.0001 and, for both the Tukey and the Multiple-Comparisons using the Wilcoxon-Method also had p-values <0.0001. This offers clear evidence that:

there is reasonable evidence to suggest for this industry-Blocked set of firms that a disconnect between the GAAP generating functions and those of the ESG-variables may exist and thus could warrant AP-investigations that are focused on the ERP&C and ICoFR protocols and their execution.

We have underlined the five conditioning elements of this AP-inference that must be considered by the InCharge in making the decision to effect an AP-investigation. This is to say that the driver of the AP-Extended Procedures Investigation for the ERP&C and ICoFR models is based on the judgment of the auditor and not solely on the statistical machinery employed in the audit. This is clearly expressed in many sections of PCAOB[AS5]. These are the same results that HWR have observed and was the characterization for the way that Non-GAAP-information was being produced and used by firms in the 1990s to “spin” the audit results. Finally, for illustration this was the same result that we found and discussed for P&G.

3. We do not learn any conditioning or mollification information relevant to the discussions in 2.) above for the results between: ESG×GAAP% [>H%] v. ESG% [>H%]. In this regard, there is NO evidence that rejecting the FPE-Null would be reasonable; nor in questioning the uniform nature of the FNE from the OCC-analysis for these two datasets. Simply, the profiles of ESG×GAAP% [>H%] & ESG% [>H%] are not likely to be different and both are inferentially different from that of the GAAP% [>H%]. Thus, we arrive at the same conclusion as expressed in 2.)—to wit: There is evidence of a disconnect between the GAAP and the Non-Financial variable sets.

4. In summary, engaging our PCAOB-required skeptical due-diligence, it is not out of the realm of investigative prudence to consider that the Non-Financial & GAAP disconnects presented in Table 4 are motivated by opportunistic “reality crafting” in the Non-Financial domain; thus, the InCharge may effect an AP-investigation and, depending on the evidence created, script out a CAM-descriptive alert to be appended to the Assurance Opinions.

5. Based on the above as a reflective context, we offer a counterpoint offered by one of our critical readers that is also not out of the realm of a skeptical-conjecture: *Entertain the possibility that the issue may be that the ESG info-set is collected from a large number of governmental sub-divisions: federal, state & local agencies and were drawn from who knows how many different sources all with likely different reporting protocols and time frames. So the lack of association, which you point out as an ERP&C disconnect, may just be a reporting disconnect!*

Yes, this is certainly a critical counterpoint that would need subsequent investigation.

Conclusions

There are a number of obvious and most needed extensions of the work reported by HWR and our results. Following, we suggest a few extensions that beg investigative attention.

A well-designed survey of audit professionals and academics would aid in creating possibly more viable population estimates of PPMC [or Spearman Association] Expectations for the Non-Financial and the GAAP variables for the OCC-Analysis. Our relative precision for the ten estimates that we collected was 7.4% [(83.7% – 68.8%)/2]. Perhaps this is unrealistically narrow; thus re-sampling using a more representative group of practitioners and academics may produce a more realistic spread so the OCC-analysis could be better defended regarding the FNE.

We have examined only a very small and highly focused sub-set of firms as populated in the BBTs: [Consumer Staples→Consumer Products→Household Products] [n=15]. An extension where the BBTs BICS could be blocked over the ten (10) BBT-rubrics and random samples taken over various Market-Cap partitions would extend the scope of the inferential benchmarking for audit risk calibration for industry groupings and aid dramatically in better understanding the population parameters as reported in Table 4.

A study modeled on that of HWR re: the Nature and Impact of the CAMs scripted out over the last few years would be most illuminating. An obvious blocking variable on the CAM-accruals would be subsequent SEC re-filings [required or voluntary] or Class-action lawsuits and the extent of fines or damages meted out to the auditor of record. In this CAM-study, it would be interesting to determine IF any of the “CAM-alerts” addressed issues created in the Non-GAAP or Non-Financial “published” pronouncements.

A study of the transparency issue put on the table by HWR is in order. Here the question is: To what extent is the Non-GAAP or the Non-Financial information based upon clear and transparent transformation of the GAAP information that is understandable to the

“average” Stockholder & Stakeholder? We really mean the average stockholder not just IB professionals or Financial Analysts—to wit: the Mom & Pop investors. This is where the PCAOB has tacitly set the information transparency bar. Recall in the “Wild-West” of the 1990s firms and sometimes their auditors tried their best to avoid culpability by constructing incompressible notes to the Financials that could be spun to their advantage. Perhaps, we have drifted back into this mind-set BOTH in the CAM and the Non-GAAP context. For example, we suggest that it would be in order to determine to what extent there is real transparency in the relationship between the GAAP and the Non-GAAP or Non-Financial information for the “average reader of the Financials of the firm under audit. Associational studies such as presented above would aid in this regard. To elucidate the need for PCAOB and SEC oversight as suggested by HWR re: transparency and readability, consider the following: We offer a “random” download from ABIInform™[ProQuest™][Wharton@-Link]: for the FileNet™[http://www.filenet.com], pertaining to a Non-GAAP release scheduled for 26July2006 for the SEC filing of 30June2006: Verbatim.

Lee Roberts, Chairman and Chief Executive Officer, and Sam Auriemma, Chief Financial Officer, will host a conference call for investors at 7:00 a.m. pacific time today. The call and presentation will be broadcast live over the Internet. To listen to the event via the Internet, please follow the instructions that are available on the investor relations' section of FileNet's Web site at <http://www.filenet.com>. A replay of the Web cast will be available for an extended period of time. Alternatively, to listen to the call live, dial (800) 591.6930. The conference call ID number for the call is 18036823. A replay of the call will be available from approximately 9:00 a.m. PT on July 26 through midnight PT on August 2. To listen to the replay, dial (888) 286-8010. The conference call ID number for the replay is 44818267.

There was appended information to the release of various GAAP-derived variables. As the header for the AIS-variables FileNet offered

Condensed consolidated statements of income (In thousands, except per share data) __ Quarter Ended June 30,__ __ Six Months Ended June 30, __ 2006__ 2005__ 2006__ 2005 __ (Unaudited)__ (Unaudited)__ (Unaudited)__ (Unaudited)

Apparently FileNet did not chose to follow the Reg[G] rules as nowhere were we able to find the reconciliation required or veracity-testing of this by the Auditors or the SEC. This is consistent with the lack of transparency noted by HWR. If this is the state of the information-[role-out] that one can expect, attendant to the Reg[G] protocol, are we being inaccurate to suggest: There could be a need for independent & informed oversight. More directly or strongly stated: Rhetorical Question: Does this seem as a MarketHype-Opportunity for FileNet or has our required PCAOB-skepticism drifted into sarcastic cynicism?!

With due-esteem and -respect, we advise our academic colleagues to integrate the Reg[G]-issues that we have broached in this research report in their A&A courses. The students, our academic charges, who soon will be young professionals moving into a very complicated Audit-milieu, will no doubt be required to write meaningful Assurance Opinions, script meaningful and not-self-serving CAMs, and be sensitive to assuring that the client has created meaningful and transparent Non-GAAP and Non-Financial reconciliations re: the Reg[G]-issues. This time will come, hopefully, very soon.

Finally, cutting to the chase, as we ALL have a dog in this hunt: Leveraging the HWR-studies and the counter-point discussion presented above, it may be time for the: AICPA, PCAOB, and SEC to empower a Treadway-esque commission to act on the need for standardization of the reporting rules and regulation protocols so as to address the possible lack of coordination between the Non-GAAP and Non-Financial information both in measure and in time-frame with the related GAAP-information sets. Only with intelligent, independent, and informed oversight will we be able to address the troubling possibility posed by the excellent HWR studies:

Have we lost control of the meaning of the Non-GAAP and the Non-Financial information; and does this suggest that we have returned to the past of obfuscation and lack of transparency?

This theme is also taken-up by Amir & Dixon (2019). In sum: It is time to address what looks like reporting and regulation “loose-ends” by involving all the stakeholders as is suggested by Cohen, Krishnamoorthy & Wright (2017) and Taylor, Chen, Taylor, Hanks & Ramey (2017). Tying this down re: the issues researched by HWR in a careful, transparent, regulated, and simple way conforms to the advice of the man who was considered wise enough to have been given the honor of gracing the \$100 bill: “An ounce of prevention is worth a pound of cure”.

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Appendix

BRK/A	JNJ	OR FP	P&G	ULVR LN	CL	HEN3 GR	KMB
4452 JP	RB/ LN	DABUR IN	051900 KS	NTCO3 BZ	SWMA SS	600436 CH	

Table A1: BBT Firms used in the study

The First five firms are from the 100B\$ partition; the next five are from the 55B\$ partition and the last five are from the 10B\$ partition.

ⁱ https://pcaobus.org/Standards/Archived/PreReorgStandards/Pages/Auditing_Standard_5.aspx

ⁱⁱ We find it very interesting that in the pre-ample of the Reg[G] promulgation of the SEC offers the following: “On July 30, 2002, President Bush signed into law the Sarbanes-Oxley Act of 2002 (Sarbanes-Oxley Act).⁷ As directed by Section 401(b) of the Sarbanes-Oxley Act, we published for comment a number of new rules and amendments to address the use of “non-GAAP financial measures” on November 4, 2002.⁸ This background pre-ample formally ties together the Sox reconfiguration of the audit rules with the concern also recognized by the SOX authors the possible divisive nature of the Non-GAAP information. <file:///F:/NonGAAPetGAAP/Final%20Rule_%20Conditions%20for%20Use%20of%20Non-GAAP%20Financial%20Measures.html>

ⁱⁱⁱ Given the transformation protocol suggested in: [Reg[G] **Section 3 a. General disclosure requirement**] the associational linkage between the Non-GAAP and the GAAP information-set should be “effectively” homomorphic as a transformation. This means the associational/correlation linkage between these two informational data-sets will be very strong. One would suppose that this is also true for the GAAP and the Non-Financial information sets.

^{iv} We will be using actual information from the BBTs however no actual data-values will be given only statistical summaries; thus we can note the actual Panel time frame without compromising the intellectual property rights of Bloomberg.

^v <https://www.bloomberg.com/impact/products/esg-data/>

^{vi} The OCC[FNE] computation uses the Excel[1-T.DIST.RT(Φ(μ),10000)] probability function.

^{vii} <https://pcaobus.org/Standards/Auditing/Pages/AS2201.aspx>

^{viii} All of the tests were taken from: SASTTM[JMPTM[DataAnalysis[FitModel]]],v.13.

^{ix} <file:///F:/NonGAAPetGAAP/ProQuestDocuments-2020-03-19.pdf>