ACCOUNTING
CONTINUING EDUCATION

Analytical Procedures Workshop

(APW4)

KAPLAN

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ANALYTICAL PROCUDURES WORKSHOP (APW4)

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NOTES

UNIT 1

Analytical Procedures Workshop

LEARNING OBJECTIVES

When you have completed this unit, you will be able to accomplish the following:

- Develop analytical procedures.
- Use analytical procedures to improve engagement planning.
- Utilize analytical procedures to identify risks of errors or fraud.
- Use analytical procedures to provide audit and review evidence.

INTRODUCTION

In recent years, practitioners have used analytical procedures increasingly as a means to **improve engagement planning, to identify risks of errors or fraud, and to provide audit evidence**. This program discusses the use of analytical procedures as an audit tool and demonstrates, in a workshop format, the application of analytical procedures.

Analytical procedures in AU-C 520.04 are defined as consisting of:

> Evaluations of financial information through analysis of plausible relationships among both financial and nonfinancial data. Analytical procedures also encompass such investigation, as is necessary, of identified fluctuations or relationships that are inconsistent with other relevant information or that differ from expected values by a significant amount.

This definition has a number of implications for auditors as follows:

- Evaluations of financial information – Analytical Procedures are used to understand or test financial statement relationships or balances.
- Plausible relationships – This would require the understanding and development of expectations related to trends, ratios, or account balances. These expectations are necessary to evaluate analytical procedure results whether developed for planning, risk assessment, review, or substantive testing.

- Financial and nonfinancial – Analytical procedures should incorporate nonfinancial bases and relationships to enhance the usefulness of the procedures. Square feet, number of shipments, number of employees, number of customers, number of beds, number of hotel rooms, number of purchase orders, etc., should be considered when using analytical procedures.
- Disaggregated Analytical Procedures – As we will see later in the program, the greater the assurance needed from an analytical procedure, the more reliable the input into the analytical procedure must be. Analytics applied to aggregated or summary data are not as effective as analytics applied to disaggregated data such as per month, per product, per customer, per division, etc.

EXAMPLE

You are analyzing a client's 25.2% increase in sales for the year and decide to obtain monthly amounts recorded as sales. (Two different scenarios for monthly postings in the current year, X2, are shown below.)

	X2 Scenario 1	X2 Scenario 2	X1
Sales for the year	$2,893,000	$2,893,000	$2,310,500
Monthly amounts:			
Jan	$180,000	$154,000	$144,000
Feb	181,000	158,400	146,500
Mar	221,600	210,500	180,100
Apr	290,400	240,400	230,800
May	345,700	316,600	280,200
June	355,300	320,200	280,800
July	301,000	275,000	240,000
Aug	261,100	235,700	210,500
Sept	204,900	195,900	165,700
Oct	199,800	178,300	158,300
Nov	178,500	302,000	140,600
Dec	173,700	306,000	133,000
Totals	$2,893,000	$2,893,000	$2,310,500

While the total sales amounts tell us that sales increased 25.2% this year, the two scenarios for X2 reflect very different situations. The first suggests a consistent percentage increase each month from X1, pointing to possibilities such as price increases, new major customers or product lines, etc. The second scenario shows a more modest increase throughout the year and a marked increase in November and December (seasonal holiday sales?), which would require investigation of both components of the increase.

While the auditor would start the investigation with inquiries of the client (to get headed in the right direction), ultimately it may be necessary to inspect nonfinancial data, such as shipping or production information. A more worrisome possibility for the increased

sales toward year-end would be the possibility of channel stuffing to fictitiously improve revenues.

NOTE TO PARTICIPANTS: Failing to account for seasonality, evident in the disaggregated data, can lead to misleading evaluations in other areas. For instance, using year-end averages for inventory and receivables ratios might misrepresent the company's true performance, as these balances may not reflect typical operations throughout the year. Therefore, monthly averages are recommended for a more accurate assessment.

Professional standards require the use of analytical procedures in the following types of engagements:

1. **Audits** – The use of analytical procedures can be broken down into the following five areas:
   - Planning – "Regular" – Required by AU-C 520
   - Planning – "Fraud" – Required by AU-C 240
   - Risk assessment – Required by AU-C 315
   - Review and wrap-up – Required by AU-C 520
   - Substantive analytical procedures in lieu of or in combination with traditional substantive audit procedures – AU-C 520 (optional)
2. **Reviews** – Along with inquiries, analytical procedures are required under SSARS as a principal procedure performed in a review engagement. Specific guidance is identified in Statements on Standards for Accounting and Review Services (SSARS) Section AR-C 90.

   In December 2022, the Association of International Certified Professional Accountants (AICPA)'s Audit and Attest Standards staff, with input from the AICPA Accounting and Review Services Committee, developed a practice Aid, *Analytical Review Procedures in a Review of Financial Statements*,[1] to illustrate and demonstrate the importance of the most misunderstood concepts when applying analytical procedures in a review engagement:
   - Forming expectations, and
   - Considering the precision of the expectation.

   These concepts are particularly important because the results of the accountant's analytical procedures substantially contribute to the information the accountant uses to provide a reasonable basis for obtaining limited assurance. Understanding the precision of the expectation is vital because limited assurance—while less than the reasonable assurance obtained in an audit—is a meaningful level of assurance that is significantly more than minimal. This Practice Aid is expected to improve the quality of review engagements performed.

The use of analytical procedures is a process comprising four phases. The first of these relates to the formation of expectations: The accountant forms an expectation of an account balance or a financial relationship; this determines both the precision of the expectation and thus (in part) the effectiveness of the analytical procedure. The remaining three phases relate to identification, inquiry, and evaluation, respectively. In the second phase, the accountant identifies any unusual fluctuations between the expected and recorded amounts. In the third, the accountant inquires of management, seeking plausible explanations for any unexpected differences. Finally, in the fourth phase, the accountant evaluates the likelihood of material

1 https://www.aicpa.org/resources/download/analytical-procedures-in-a-review-engagement

misstatement and determines the nature and extent of any additional review procedures considered necessary.

Forming an expectation is the first—and the most important—phase of the analytical procedure process. The more precise the expectation (that is, the closer the accountant's expectation is to the correct balance or relationship), the more effective the procedure will identify potential misstatements. In a review engagement, the expectation needs to be precise enough to provide limited assurance that potential misstatements (individually or when aggregated with other misstatements) would be identified for the accountant to then inquire of management regarding their cause. Although limited assurance is less than the reasonable (that is, high) level of assurance obtained in an audit engagement, it is a sufficiently meaningful level of assurance to provide a basis for the accountant's conclusion in the review report that users can rely on in making determinations regarding the financial statements.

The practice aid includes the following factors an accountant considers when developing expectations:

- Understanding of the entity and the industry in which the entity operates
- Nature of the account or assertion
- Reliability, consistency, and other characteristics of the data
- Inherent precision of the expectation method used:
- Trend analysis
- Ratio analysis
- Reasonableness testing
- Regression analysis
- Relationship between the methods used to develop an expectation and the precision of the expectation

The appendix contains financial ratios that might be helpful to an accountant performing some of the analytical procedures discussed in the practice aid. These financial ratios include liquidity, activity, and efficiency ratios.

Also, analytical procedures are required for reviews under the attestation standards in Statement on Standards for Attestation Engagements (SSAE) No. 22 *Review Engagements*.

Documentation

Even though the form of documentation is left to the professional judgment of the auditor/accountant, AU-C 230 and SSARS Section AR-C 90 require the following approach to be used in performance and documentation:

- The accountant must, based on the understanding of the client operations and the industry in which they operate, develop the **expected result** and tolerable error of the procedure to be performed.
- The accountant then performs the analytical procedures and compares the recorded amount to the results obtained and the expectation.
- If the result varies from the expectation by an amount that is outside of the pre-identified tolerable range, the accountant must do more.
  - In a review, the accountant obtains additional review evidence through inquiry and/or the performance of other procedures, including more detailed or disaggregated

analytical procedures, to obtain review evidence as the basis for the expression of limited assurance.

- In an audit, the auditor obtains additional sufficient and appropriate audit evidence to resolve the discrepancy between the results obtained and the expectation. Inquiries alone are not sufficient; additional audit evidence must be obtained to support the auditor's opinion.

NOTE TO PARTICIPANTS: Developing expectations can be accomplished in a number of ways using information obtained from any number of sources (e.g., knowledge of the industry, knowledge of the business, economic trends and conditions, client history).

Before we begin, let's address some misconceptions about why analytical procedures are considered by some to not be useful or effective in providing audit evidence. Some perceived misconceptions are:

- **Many practitioners believe analytical procedures, especially during planning, are ineffective on engagements where the auditor is expected to make significant year-end adjustments.**

  Recognizing the inevitability of significant year-end adjustments in certain accounts presents a unique opportunity for auditors to transcend conventional planning procedures. By proactively incorporating estimated adjustments into their initial analytical framework, they can wield a more targeted and insightful lens to scrutinize the client's financial landscape. This prescient approach transcends mere anomaly detection, allowing auditors to pinpoint potential risks with laser-like precision and prioritize subsequent audit procedures with optimal efficiency.

  Furthermore, the knowledge gleaned from analyzing adjusted data transcends the realm of financial verification. It fosters a deeper understanding of the client's business operations, potentially illuminating hidden errors or even fraudulent activity. This newfound insight then informs the tailoring of audit procedures, ensuring a customized approach that strategically addresses identified risks. This dynamic adaptation empowers auditors to move beyond rote verification and actively navigate the nuances of the client's financial structure, mitigating potential misstatements with greater effectiveness.

  In essence, embracing the challenges of anticipated adjustments is not merely a navigational tactic; it is a transformative act. It elevates the audit from a reactive verification exercise to a proactive risk mitigation endeavor. By delving deeper into the fabric of the client's operations, auditors emerge with not only a robust understanding of potential risks but also a strategic framework that helps to identify potential errors or fraud that will impact the nature, timing, and extent of audit procedures.

- **Analytical procedures require subjective judgments such as, "How much can an amount fluctuate before I need to investigate a difference? How much of the difference must I explain before I can stop?"**

  Subjectivity enters into an auditor's professional judgment. This is unavoidable. However, this leads to improved risk assessments by forcing the auditor to do the following:

  - *Recognize the inherent judgment in analytical procedures*: While analytical procedures provide valuable insights into financial data, they are not immune to the influence of professional judgment. Key determinations, such as the materiality threshold for investigating variances or the sufficiency of explanations for anomalies, inherently involve subjective assessments.

- *Embrace subjectivity for enhanced risk assessment*: This element of subjectivity should not be viewed as a weakness, but rather as an opportunity to enrich the risk assessment process. By grappling with the magnitude of discrepancies and their potential impact on the financial statements, auditors are forced to move beyond abstract notions of materiality and confront the concrete realities of potential misstatements.
- *Contextualize judgment for improved nuance*: The flexibility inherent in subjective judgment allows auditors to tailor their analyses to the specific circumstances of each engagement. A variance considered immaterial in a highly volatile industry may raise significant concerns in a more stable environment. This contextually sensitive approach leads to a more nuanced understanding of risk, providing a more accurate picture of the potential for misstatement.
- *Use professional judgment as a guide, not a shortcut*: It is crucial to emphasize that subjective judgment in analytical procedures is not a shortcut, but rather a complement to objective data analysis. The ability to weigh context, prioritize concerns, and navigate ambiguities strengthens the overall audit process. Professional judgment acts as a valuable guide, directing auditors toward areas where further investigation is most warranted.

The inherent subjectivity in analytical procedures presents both challenges and opportunities. By acknowledging its presence, embracing its potential to enhance risk assessment, and applying it within a framework of professional judgment, auditors can leverage this critical element to extract deeper insights from financial data and ultimately deliver a more robust and effective audit.

- **Effective analytical procedures require a thorough knowledge of the client's operations, especially nonfinancial considerations and their effects on the accounts. This entails conferring with client personnel outside of accounting and gathering information about production, personnel, marketing, and similar functional areas.**

  Delving deeper than mere financial data is essential for comprehensive analytical procedures. A thorough understanding of the client's operations, including nonfinancial considerations and their impact on accounts, is crucial for minimizing the risk of undetected misstatements. This necessitates active engagement beyond the accounting department, consulting with personnel across production, personnel, marketing, and similar functional areas.

  Far from an obstacle, this engagement presents an opportunity to forge deeper client relationships and enhance audit quality. Too often, auditors isolate themselves, relying solely on the accounting department for information. This can hinder understanding and limit the identification of potential risks. Inexperienced staff are particularly susceptible to this, lacking the confidence and knowledge to effectively engage with nonaccounting personnel.

  By actively engaging with various client departments, auditors can gain invaluable insights into the company's dynamics. Production reports may reveal resource discrepancies, HR data might signal unusual employee turnover, and marketing trends could foreshadow revenue fluctuations. These seemingly nonfinancial details, when combined with financial analysis, offer a more holistic perspective, enhancing the ability to detect and assess potential misstatements.

  This deeper engagement requires strategic planning. Training should equip staff with the knowledge and skills to ask impactful questions and interpret responses effectively. Building trust with client personnel is paramount, fostering an environment of open communication and collaboration.

Ultimately, proactive engagement beyond the accounting department is not merely a procedural requirement; it represents a commitment to delivering high-quality audits. By embracing the complexities of a client's operations, auditors gain a comprehensive understanding, mitigate risks, and ultimately, provide greater assurance to stakeholders.

- **Analytical procedures must be customized for each engagement, thereby requiring more planning and greater knowledge of the client than tests of detail.**

  While tests of detail offer granular assurance through their meticulous examination of individual transactions, they may lack the holistic perspective necessary to effectively assess risk. Relying solely on tests of detail can overlook broader inconsistencies in financial statements. Analytical procedures also necessitate a deeper understanding of the client's specific business environment and risk profile. This customization, though demanding in terms of planning and knowledge acquisition, also presents a valuable opportunity to strengthen the auditor-client relationship.

  By delving into industry trends, internal data patterns, and correlations between financial elements, analytical procedures allow auditors to gain a comprehensive view of the client's financial landscape. This deeper understanding fosters proactive identification of potential misstatements, as subtle anomalies and inconsistencies become more readily apparent.

  While tests of detail remain a crucial component of the audit process, analytical procedures should not be viewed as an additional hurdle, but rather as an avenue to enhance audit efficiency, identify significant risks, and build a more informed and collaborative relationship with the client.

- **Analytical procedures are mistakenly regarded as less effective evidence.**

  In reality, well-designed analytical procedures can provide meaningful/reliable audit evidence. The reasons analytical procedures "don't work" include not having enough data, or the right data, to develop reliable bases of comparison; a failure to disaggregate the data and the analytical procedures; and a willingness to accept client explanations without exercising proper professional skepticism.

Note that the maintenance of professional skepticism during audits is enhanced in new guidance issued by the Auditing Standards Board for calendar year 2023 audits (Statement on Auditing Standards No. 145, Understanding the Entity and Its Environment and Assessing the Risks of Material Misstatement (SAS No. 145) discussed later in this course. SAS No. 145 contains several key provisions that are designed to enhance and emphasize the auditor's professional skepticism, including the following:

- Clarifying that an appropriate understanding of the entity and its environment, and the applicable financial reporting framework, provides a foundation for being able to maintain professional skepticism throughout the audit
- Highlighting the benefits of maintaining professional skepticism during the required engagement team discussion
- Highlighting that contradictory evidence may be obtained as part of the auditor's risk assessment procedures

We will discuss the use and application of analytical procedures in different circumstances, as well as discuss when certain analytical approaches might be more useful than others.

Source material for this program was derived from:

- AU-C 500 – Audit Evidence
- AU-C 520 – Analytical Procedures

- AU-C 315 – Understanding the Entity and Its Environment and Assessing the Risks of Material Misstatement
- AU-C 330 – Performing Audit Procedures in Response to Assessed Risks and Evaluating the Audit Evidence Obtained
- AU-C 240 – Consideration of Fraud in a Financial Statement Audit
- AICPA Audit Guide – Analytical Procedures
- SSARS – Preparation, Compilation and Review Engagements

USES FOR ANALYTICAL PROCEDURES FOR AUDITS

The following is a discussion on the basic uses for analytical procedures.

Planning—"Regular"

The purpose of these procedures is to identify areas in which the auditor's approach needs to be modified from the prior period. In the small business audit, this can usually be accomplished with a comparison of current period balances to prior period balances (with the appropriate caution regarding accounts known to need significant adjustment) and/or a review of account activity. These procedures may be accomplished on an "aggregate" basis.

The best way to accomplish and document this analytical procedure is by identifying the major items on a preliminary comparative balance sheet and income statement or trial balance. On the comparative schedule, or in a separate memo, you can indicate where a change in audit approach is required. The modification would include specifically designed procedures to address the issue. The following are examples of issues that might require a change in approach:

- Accounts Receivable increased disproportionately to sales. Change in approach might include expanding work on cutoff, confirmations, aging, and bad debts.
- Noted large increase in Property, Plant, & Equipment (P&E) could be addressed by knowledge of business combinations, expansion plans, and vouching all significant items.
- Noted no large increase in PP&E but Repairs and Maintenance increased significantly. Change in procedures might include reviewing the capitalization policy and the Repairs and Maintenance account for items exceeding the capitalization policy, which may need to be capitalized.
- Accounts Payable decreased significantly. Has business activity declined? Consider expanding the scope of testing subsequent disbursements to look for unrecorded liabilities.
- Noted significant increase in Sales. Expanding cutoff procedures to include reviewing shipping documents or performing disaggregated analytical procedures. Consider the possibility of fraudulent activity (e.g., channel stuffing).
- Noted no increase in Advertising despite the fact that client indicated that they had increased the advertising budget to increase market share. Procedures to identify these additional expenses and misclassification would be the result.

The purpose of these procedures is not to find answers to fluctuations but rather to identify areas where the auditor's focus (further audit procedures) should be tailored to the specific risk of error identified. In fact, these types of analytical procedures are typically more qualitative than quantitative. They may focus more on what is not there than what is there.

NOTE TO PARTICIPANTS: Developing valuable planning procedures that differ from the previous year's requires a clear understanding of what to expect based on the specific entity and its industry context. The direction of expected changes is just as insightful as quantifying differences. It's important to remember that "regular" planning analytical procedures and those used for fraud and risk assessment often intersect, as issues identified in either can point to potential misstatements in the financial statements. **The primary goal is to pinpoint potential error risks, not to precisely quantify the error amount. Planning analytical procedures are typically conducted at a less detailed level compared with substantive testing.** Additionally, it's crucial to consider any findings from non-attest services being performed as part of the engagement.

Planning—Risk Assessment

AU-C 315 requires that when auditors perform risk assessment procedures (error or fraud) they do so to obtain an understanding of the entity and its environment, including internal control. These procedures include:

- Inquiries of management and others within the entity
- Analytical procedures
- Observation and inspection, including walkthroughs

Analytical procedures assist auditors in understanding where the risks of error or fraud may exist. Analytical procedures at an aggregate level (as described in AU-C 520) may only provide a general idea of whether error or fraud risk areas exist. Therefore, the auditor should consider the results of the risk assessment analytical procedures performed along with other risk assessment procedures performed when forming a conclusion concerning the risks of error or fraud in financial statements.

When performing analytical procedures as risk assessment procedures, the auditor should develop expectations about plausible relationships that are reasonably expected to exist, just as the auditor would do for substantive analytical procedures. While these expectations may be developed using both aggregated and disaggregated sources, auditors in planning normally perform these analytical procedures at the aggregated level.

NOTE TO PARTICIPANTS: A key misconception regarding planning analytical procedures is that the auditor is looking for explanations. In fact, explanations and verification are what occur during the work phase of the audit and not at this stage.

The following examples illustrate the straightforwardness of planning analytical procedures when an adequate knowledge of the client has been obtained; note the potential risks of misstatement that are identified.

EXAMPLE

You are engaged in the audit of a new HVAC installation and maintenance client. This demands a keen understanding of the industry's intricacies. This knowledge acts as a compass, guiding you, the auditor, toward anticipated accounting elements such as:

- *Contract accounting for revenue recognition*: A well-maintained system ensures accurate recognition of revenue earned through installations and ongoing maintenance contracts.
- *Warranty expense and accruals*: Proper accounting for expected warranty claims and related accruals is crucial for financial stability.

- *Unearned revenue from maintenance contracts*: This liability reflects the prepayments received for future maintenance services, requiring meticulous recording and reporting.

However, the absence of these expected balances or anomalies in their complexity can raise red flags for the astute auditor. Equipped with industry insights, you can recognize such inconsistencies as potential misstatements, prompting a shift in strategy.

Prioritizing Analytical Procedures for Completeness:

Before embarking on detailed tests, you should leverage analytical procedures. These qualitative assessments, rather than focusing on precise amounts, paint a broader picture of the financial landscape. The aim is to confirm the presence of all expected elements, ensuring completeness in the recorded information. This approach is particularly effective in identifying potential omissions, complementing the traditional focus on verifying existing entries.

Unearthing the Hidden: The Importance of Completeness:

A comprehensive audit extends beyond the confines of the ledger. Just as crucial as confirming what's recorded is identifying what's missing. Unrecorded transactions, contingent liabilities, or off-the-books activities can significantly distort the financial picture. Therefore, the auditor actively seeks out such hidden information, ensuring a more accurate representation of the company's financial health.

By combining industry knowledge with risk-based audit techniques, particularly prioritizing analytical procedures for completeness, you as the auditor can navigate the complexities of HVAC businesses. This approach not only enhances efficiency but also uncovers potential misstatements, leading to a more reliable and insightful audit outcome. Remember, a thorough audit requires peering beyond the surface, ensuring all financial elements are brought to light, whether recorded or hidden.

EXAMPLE

	X2	X1
Selling expense	$85,000	$40,000

Many CPAs, when asked to explain what caused these changes, offer explanations such as:

- *Sales increased*
- *Company introduced a new product*
- *Company changed or increased commissions paid on sales*
- *Company launched a major advertising or promotional campaign*

A pronounced discrepancy in selling expenses, from $40,000 to $85,000, warrants investigation. However, seasoned auditors are cognizant of the need to delve beyond facile explanations such as increased sales or product launches. These represent anticipated consequences of foreseeable business developments, typically pre-integrated into budgets and expected during planning.

While appreciating the validity of these seemingly plausible rationales, prudent audit practice compels us to prioritize **unanticipated deviations**: instances where observed data significantly contradicts our informed understanding of the client's business and its financial transactions. A seemingly anomalous surge in selling expenses aligned with a strategically planned marketing campaign's projected sales rise, for example, would not inherently trigger alarm bells.

The true value of an audit lies not in merely confirming anticipated trends, but in illuminating and scrutinizing unexpected variances. These discrepancies, not the validations of forecasted fluctuations, serve as potential flagpoles for potential misstatements. They are the narrative twists in the audit's investigative journey, directing our focus toward areas necessitating deeper analysis and potentially unearthing hitherto concealed irregularities.

EXAMPLE

During the initial planning phase of your audit, a potential discrepancy arose regarding the client's workers' compensation expense. Discussions with senior management revealed a significant 25% increase in workers' compensation insurance rates compared with the prior year. This rise in risk exposure would prompt further investigation.

A preliminary review of the trial balance indicated that the insurance expense remained consistent with the previous year. This data point would warrant closer scrutiny, as it deviated from the expectation established by the increased insurance rates.

The insurance expense account should be identified as an area requiring special attention during the audit. This discrepancy requires an examination of the underlying transactions and accounting practices to reconcile the conflicting data points. A deeper understanding of the reasons behind this anomaly is crucial to ensure accurate financial reporting and informed decision-making.

The planned audit procedures should be adapted to address this specific area of concern. The auditors should employ detailed analytical techniques and potentially seek additional information from the client's management team to gain a comprehensive understanding of the factors influencing the insurance expense.

By proactively addressing this discrepancy early in the audit process, the auditors would aim to achieve a complete and accurate picture of the client's financial health. This will ultimately contribute to a more reliable audit opinion and provide valuable insights for stakeholders.

Planning analytical procedures should include documentation in the work papers. For example, the summary audit planning memo might include a section devoted to the results of the analytical procedures performed, the anticipated further audit procedures, and linkage to the evidence expected.

Audit Planning Memo (Excerpt)

Planning Analytical Procedures (In Part)

We noted insurance expense consistent with prior year despite management informing us that workers' compensation rates went up 22% this year. We will scan monthly postings and examine information from the insurance carrier and vouch documents as necessary to determine if this expense is misstated.

Reading and scanning ledgers and journals is one of the most common and informative procedures performed during audit planning, but it is rarely documented in the work papers. Scanning accounts can be a very effective and efficient way to isolate activity with high risk of misstatements—for example:

- Unusual entries, such as "backwards" entries to revenue and expense accounts, or partial payments for odd amounts in accounts receivable (a sign of lapping)

- Evidence of omitted or misclassified transactions, such as missing or extra monthly postings to stable expense accounts (rent, interest, insurance, etc.)
- Unusual posting sources for entries to accounts where activity is usually from standard journals (e.g., sales, accounts payable, accounts receivable, purchases, or payroll)
- Atypical activity near the end of a period, such as an inordinate proportion of open receivables items posted in the last two days of the year
- Unusual patterns, such as a batch of manual checks for round amounts written at particular times during the year

The following are some examples of this type of analytical procedure:

- Scanning rent expense in the ledger to see that there are 12 equal entries
- Scanning telephone expense to see that all payments were to AT&T, Verizon, etc.
- Scanning utility expense to determine that there are 12 payments, along with reviewing the last payment to determine what month is being paid
- Scanning repairs and maintenance to determine there are no amounts over a certain dollar threshold suggesting capitalization was required
- Scanning miscellaneous expense to determine if there are unusual items. Unusual items could be defined as misclassifications, or in the case of small businesses, personal expenses of a related party.

As with all audit procedures, these analytical procedures should be designed with a thorough knowledge of the client's business and industry. On many small business engagements, this can be accomplished with a month-to-month comparison of key accounts. In addition, accounts or classes of accounts should be broken down into their most disaggregated components. For example, if a company has products with different gross profit margins, comparing total gross profit on a period-to-period basis does not consider product mix in analyzing accounts.

Exhibit A represents a widely adopted reporting format recognized for its flexibility and scalability. Its structure accommodates extended analytical periods of 24 or 36 months, offering a holistic view of data trends. Furthermore, Exhibit A leverages the power of existing tools like IDEA and Galvanize (ACL), facilitating seamless data extraction and minimizing preparation time.

However, Exhibit A's value extends beyond data aggregation. It serves as a dynamic canvas, readily customized to accommodate the specific needs of each client. Key information pertinent to their industry, business challenges, and unique context can be integrated, ensuring targeted analysis and clear communication.

This tailored data capture within Exhibit A provides a foundation for insightful analytical exploration. It provides the springboard for uncovering critical relationships, identifying emerging patterns, and drawing actionable conclusions. These insights, in turn, fuel the development of robust audit procedures, crafted to address each client's specific challenges and circumstances.

Exhibit A

		Current Month	Month	Month	Month	Month	Month	Month	Month	Month	Month	Month	Last Month
(a)	Sales												
(a)	Cost of Sales												
	Gross Profit												
	Operating Expenses:												
	-												
	-												
	-												
	-												
	Net Income												
	Accounts Receivable												
	Write-Offs												
	Allowance for Doubtful Accounts												
	PP&E:												
	Additions												
	Disposals												
	Accounts Payable												
	Inventory												
	Long-Term Debt												
	Number of Employees												
	Square Feet Utilized												
	Number of Customers												
	Number of Shipments												
	-												
	-												
	-												
	-												

(a) Recommend breakdown by product line

NOTE TO PARTICIPANTS: As the volume of electronic transactions increases, manually reviewing them becomes less effective. Accounting firms are adopting electronic data extraction tools like TeamMate Analytics or IDEA to automate these analytical procedures. For smaller practices, importing general ledger data into Excel and sorting it can be a valuable alternative for analyzing financial information.

Planning – "Fraud"

AU-C 240 requires that analytical procedures be performed to identify potential fraud risks. Remember, fraud is intentional. analytical procedures will not, in and of themselves, detect fraud. However, they can reveal fraud risk factors. In many cases, the easiest and quickest way to obtain evidence that might indicate that fraud has occurred is with an analytical procedures used in considering fraud in planning.

These procedures are essentially looking for anomalies in the client's records that may be indicative of possible fraud such as:

- Improper cutoff: that is, a client "closing the books early" for tax purposes or "keeping the books open" to enhance earnings to renew the line of credit
- Creation of fictitious revenue
- Not writing off obsolete inventory
- Not writing off bad debts
- Ghost employees
- Overstatement or understatement of inventory
- Improper capitalization or expensing of certain costs
- Constant changes in vendors
- Improper revenue recognition

While uncovering fraudulent activity often looms large in discussions of audits, it's essential to clarify the specific responsibilities of a GAAS audit. Contrary to popular misconception, its primary focus is not on actively "detecting" frauds. Instead, GAAS audits adopt a proactive approach, aiming to identify and mitigate potential fraud risk factors.

While eliminating fraud entirely might be an elusive ideal, a well-executed GAAS audit strives for something far more tangible – reasonable assurance. This translates to a carefully woven safety net designed to catch any material misstatements, whether caused by fraud or error that could distort the true picture of a company's financial health. By prioritizing this risk-based approach, GAAS audits deliver the crucial service of providing reliable and accurate financial statements that stakeholders can confidently rely upon, even amidst potential threats.

Consequently, it's vital to distinguish between the proactive risk management inherent in a GAAS audit and the reactive pursuit of uncovering past misdeeds through forensic investigations. While GAAS audits may not unearth every hidden transgression, their emphasis on building robust risk-mitigating frameworks delivers a far more valuable outcome – financial statements that stand as solid representations of reality, offering a high degree of accuracy and reliability for informed decision-making.

Unlike typical planning analytical procedures, these fraud risk analytical procedures should be performed on a disaggregated basis. Disaggregated analytical procedures combined with significant nonfinancial measures improve the auditor's ability to identify unusual or unexpected relationships that may be indicative of fraudulent activity. Applying fraud risk

analytical procedures to sales, for example, may include the following disaggregated relationships:

- Revenue by month, by location
- Revenue per customer
- Revenue per month, by customer
- Revenue per product line
- Revenue per available square feet
- Revenue per employee
- Revenue per shipment
- Revenue returns per month, per customer, per product line
- Gross profit per customer, per location, per product line
- Cash receipts to sales, by month, by location

These analytical procedures are also examples of the analytical procedures that meet the requirements in the standards for testing "disaggregated" revenue.

This approach, for example, could have highlighted problems in some of the following "infamous" audit scandals:

- **WorldCom**—In this case, the CFO allegedly made a journal entry every quarter to debit fixed assets and credit expenses or sales, thus enhancing earnings. Exhibit A would have highlighted increased fixed asset additions in March, June, September, and December. Remember, WorldCom was a public company and the CFO was attempting to manage quarterly results.

  For the small business client, December might be the triggering month. Again, the mere fact that there are increased additions does not in itself indicate fraud. For example, many small businesses capitalize or expense all additions throughout the year and then analyze and adjust at year-end. The purpose of the exercise is to alert the auditor to dig deeper. Remember also that AU-C 240 cautions the auditor to be skeptical. Often, the client answer will be "we waited until year-end to analyze capital items." This could mask the true nature of the items.

- **Cendant Corp.** —Here the company "kept the books open" in order to increase revenues. By reviewing December/January amounts, the auditor might have been alerted to the problem. Remember, in the small business environment, the "tax motivated" client is more likely to close the books early. If tax motivation has been identified as a client fraud risk factor, the Exhibit A schedule may be expanded to include key expense categories.

- **Sunbeam**—In order to enhance earnings going forward, Sunbeam adopted a policy of including "non-impaired" inventory in its write-off policy. When the inventory was later sold, it had a "0" cost, thus increasing profits significantly. A product-by-product comparison on Exhibit A might have highlighted this problem.

- **Phar Mor**—To overstate earnings and achieve performance targets, Phar Mor management made fraudulent quarterly entries to debit inventory and credit sales. This led to an unusual increase in days' inventory on hand that should have been identified as part of any analytical procedures performed.

Period-to-period comparisons are not the only analytical procedures that may highlight a fraud risk factor. The following are examples where "common sense" analytical procedures may have identified a problem:

- **American Express – Tino DeAngelis "Salad Oil"**—In this famous case, "supposed" oil inventory stored in tanks in New Jersey exceeded the capacity that could be held in all of

the oil tanks in the continental United States. A simple comparison of tank capacity to oil quantities would have detected the problem.

- **Cisco Systems and California Software**—These companies shipped products to customers who did not order them and recorded the sale. The product was later returned and the "sale" was reversed. A comparison of returns to normal expectations might have uncovered the problem.
- **ZZZZ Best**—Revenues from restoration contracts were 200 times that which was being experienced in the industry. "Industry statistics" would not have required detailed Standard & Poor's comparisons but merely an understanding of what profit margins could be expected in the industry.

> **NOTE TO PARTICIPANTS:** Regular, fraud and risk assessment analytical procedures should focus on where to plan for further audit procedures. In other words, where to begin work, how and where to modify the audit program to design procedures to specifically address the risks identified and to link the evidence obtained.

Review and "Wrap-Up"

Analytical procedures in this phase of the audit are typically performed at a high level (i.e., aggregated as with the planning analytical procedures) and are designed principally to determine that:

- **All items or issues identified in the planning phase have been addressed**. For example, if the fraud risk analytical procedures indicated a potential cutoff problem, what additional work was performed by the auditor? If the period-to-period comparison of fixed assets in the planning stage indicated no increase, was audit work limited to scanning the fixed asset account to verify this and was detailed vouching eliminated? Updating the planning memo by indicating and referencing where the work was done or eliminated could be adequate.
- **The overall financial statement presentation is appropriate**. Here the purpose is to make sure that the final presentation "makes sense." For example:
  - Calculate the provision for taxes on a "C" corporation as a percentage of income before taxes and compare it to 21%. At a minimum, if it is not 21%, a footnote is needed. Be careful of the trap of oversimplifying and concluding that state taxes or the "step-up in rates" is the answer. Often, the answer lies in an incorrect deferred tax calculation.
  - Audit adjustments to income or expense that do not take into consideration the related tax effects were not considered.
  - Audit adjustments that do not reflect the comprehensive effect on the financial statements were not considered.

This can often be documented by annotations or updates to the planning memo.

> **NOTE TO PARTICIPANTS:** The review analytical procedures should focus on the broader scope of misstatement of the financial statement to determine if additional procedures should be performed. Are we finished yet?

Substantive Analytical Procedures (Optional, Not Required)

While not required in an audit, well-designed substantive analytical procedures can provide the auditor with assurance without detailed ticking, tying, tracing, and confirming.

Before we review these types of analytical procedures, it is important to understand that although similar, there are significant differences in their use in audits versus reviews:

- **Level of assurance desired**. In an audit, we are performing these analytical procedures to determine that the financial statements are "fairly presented." In a review, the accountant is looking for limited assurance that no material modifications are required. Therefore, in an audit, a more precise expectation is required because the level of assurance must be greater.
- **Follow up on unexpected results**. In an audit, these variances must be audited. In a review, a reasonable explanation from the client is acceptable. For example, "salaries went up because a bonus was accrued in December" is acceptable in a review. In an audit, this explanation might necessitate verifying or confirming the approval for the bonus and vouching its subsequent payment.

NOTE TO PARTICIPANTS: Paragraph 1.45 of the *Audit Guide on Analytical Procedures* states the following:

When analytical procedures serve as substantive tests, the auditor should ordinarily corroborate explanations for significant differences by obtaining sufficient appropriate audit evidence. The procedures used to corroborate the explanation depend on the nature of the explanation, the nature of the account balance, and the results of other substantive procedures. To corroborate an explanation, one or more of the following techniques may be used:

- *Inquiries of persons outside the client's organization.* For example, the auditor may confirm discounts received with major suppliers or agree to changes in commodity prices with a commodities exchange or the financial press.
- *Inquiries of independent persons inside the client's organization.* For example, an explanation received from the financial controller for an increase in advertising expenditures might be corroborated with the marketing director. It is normally inappropriate to corroborate explanations only by discussion with other accounting department personnel.
- *Evidence obtained from other auditing procedures.* Sometimes the results of other auditing procedures (particularly those performed on the data used to develop an expectation) are sufficient to corroborate an explanation.
- *Examination of supporting evidence.* The auditor may examine supporting documentary evidence of transactions to corroborate explanations. For example, if an increase in cost of sales in one month was attributed to an unusually large sales contract, the auditor might examine supporting documentation, such as the sales contract and delivery dockets.

In contrast to planning and overall review analytical procedures, substantive analytical procedures are performed as an evidence-gathering activity when the auditor is able to develop independent expectations or predictions (financial and nonfinancial) concerning a relationship or a recorded amount. Independent data must be based on previously audited or independently validated information. The more disaggregated the data, the better the test.

Substantive analytical procedures are normally applied to balances that are either low risk, immaterial, or well suited to independent estimation (such as revenues/expenses or other predictable amounts).

The primary purpose of substantive analytical procedures is to obtain audit evidence, just like detail tests. Substantive analytical procedures may comprise the primary test of an account balance or can be used in combination with other substantive (detail) tests.

What makes substantive analytical procedures different from just general review procedures?

- **Independent expectations** are developed by the auditor for an account balance or ratio or trend.
- Analytical procedures use **audited or plausible third-party data** (such as industry data) to develop independent expectations.
- Analytical procedures are applied to **disaggregated segments or sub-units** of an entity or balance (monthly or daily data, geographic area, department, product line, salesperson) rather than the entity as a whole.
- **Immaterial differences** between the auditor's expectations and the recorded amounts would generally support the reasonableness of the account balance.
- The auditor, to determine whether the account balance is or is not fairly stated, must investigate **material differences** between the auditor's expectations and the analytical procedures results. Substantive analytical procedures are an acceptable difference between the auditor's expectation and the result.
- For **significant risks** at the assertion level, substantive analytical procedures are <u>not</u> sufficient by themselves.
- **Effectiveness tests of controls**, combined with substantive analytical procedures, are always appropriate.

NOTE TO PARTICIPANTS: If the auditor evaluates an assertion or account as a significant risk, AU-C 330 does not permit the auditor to use substantive analytical procedures as the only evidence developed to support the assertion or account balance. If substantive analytical procedures are utilized, either tests of controls or other substantive procedures must also be performed.

The following examples demonstrate the use of independent expectations when applying substantive analytical procedures.

EXAMPLE

Restaurant Sales Prediction: To assess anticipated restaurant revenue, the auditor adopts a two-pronged approach. Independent third-party napkin cleaning records estimate customer volume, which is then multiplied by an audited average meal price. This methodology leverages verifiable data sources while accounting for customer traffic.

Direct Labor Cost Testing: Verification of direct labor hours is paramount in evaluating this expense. The auditor independently confirms the hours worked, ensuring accuracy, and then utilizes predetermined, contractually stipulated average labor rates for efficient analysis.

Company Sales Prediction: Accurate shipment counts, independently verified by the auditor, serve as the foundation for this analysis. This verified volume is then multiplied by an audited average shipment price, derived from reliable sources, to estimate total sales with confidence.

Hotel Room Revenue Prediction: Industry-specific local occupancy data from comparable hotels provides valuable context. The auditor leverages this data, alongside an independently developed average room rate, to generate a well-informed prediction of the hotel's room revenue potential.

Interest Expense Testing: Confirmed debt balances undergo a meticulous transformation by the auditor. Applying verified average interest rates, calculated after comprehensive analysis, transforms these balances into estimated interest expense figures for precise evaluation.

Sales Commission Expense Testing: Independent verification of commission rates ensures accurate calculations. These rates are then multiplied by independently audited sales figures, providing a clear picture of expected commission expense and facilitating effective control assessments.

Although not required, substantive analytical procedures can often replace time-consuming and repetitive substantive detailed testing, such as vouching and confirming. In considering whether to use substantive analytical procedures in lieu of other substantive tests, the auditor should consider several factors:

- **Inherent and control risk** – All other factors being equal, substantive analytical procedures are considered most appropriate for audit populations with a low risk of material misstatement ("RMM"). In some cases (most notably estimates such as receivables allowances and contingent losses), analytics are used despite the "riskiness" of the amount, by necessity.
- **The nature of the account being tested** – By definition, substantive analytical procedures endeavor to predict recorded amounts. Consequently, the more predictable an amount, the more effective and efficient analytics are likely to be. Generally, **revenue and expense balances**, which represent an accumulated total of repetitive transactions, are better suited to analytical procedures than are assets and liabilities.
- **The nature of the assertion being tested** – The bulk of substantive tests addresses the existence, completeness, and valuation assertions. The auditor's assessment of risk includes determining whether he/she is most concerned with potential **overstatements or understatements** in a given population.

  Substantive detailed tests are designed to either substantiate recorded amounts with evidence or trace evidence of transactions to inclusion in recorded amounts. Which direction we test is based on which assertion (existence or completeness) is riskier. In contrast, substantive analytical procedures tend to isolate unexpected differences in either direction. This can be especially useful when completeness is a concern, because it is always easier to audit what is on the books with detail tests than it is to detect what might be missing from the books.
- **The precision of our expectation for the recorded amount** – The auditor must determine the significance of the **amount of difference** between the predicted and recorded balance that will trigger investigation (i.e., testing) of the difference. This degree of precision should incorporate materiality and risk factors. The riskier the population or the smaller materiality is, the less difference from expected amounts can be tolerated without investigation. Analytical procedures are better suited to situations where the tolerable misstatement is high.

  The concept of tolerable misstatements – acceptable margins of error – is a crucial tool for navigating potential risks. As outlined in the AICPA's *Assessing and Responding to Audit Risk in a Financial Statement* guide, any discrepancy approaching this threshold warrants heightened scrutiny. The likelihood of a material misstatement breaching the tolerance level escalates, triggering the need for proactive measures. To mitigate this risk, the guide advocates for a proportionate response – additional audit procedures aimed at reducing the discrepancy and ensuring it comfortably falls within acceptable boundaries.

  Beyond the immediate risk zone, variances fall into two distinct categories: those within the acceptable range, indicating satisfactory test results, and those exceeding the bounds, necessitating further investigation. Unacceptable variances demand a robust response – detailed testing and meticulous examination to illuminate the root cause of the discrepancy and restore confidence in the financial statements' integrity.

Similar vigilance is required when dealing with analytical discrepancies serving as substantive tests. As emphasized by the *Assessing and Responding to Audit Risk in a Financial Statement* guide, thorough corroboration of the explanations offered for such deviations is paramount. This verification process, however, must be tailored to the specifics of each situation, considering the nature of the explanation, the account balance involved, and the broader context revealed by other procedures. Only by employing such customized analysis can auditors unveil the true story behind discrepancies and ensure the financial statements accurately reflect reality.

- **The availability of reliable, independent data** – When auditors develop an expectation for recorded amounts, they are really saying that they've used information that qualifies as **adequate evidential matter** in developing that expectation. For this reason, **reliable, independent data should come from:**
- **Outside the entity** – This can be industry statistics, contracts written by third parties (lease and loan agreements), etc. It possesses the reliability of third-party evidence, just as confirmations do for detailed tests.
- **Audited information** – Amounts actually audited in current or prior years can be considered reliable data for developing estimates. Conversely, **unaudited amounts should not be used to develop substantive analytical estimates**. A frequent deficiency is the "reasonableness" conclusion for the relationship between cost of sales and sales when neither amount has been audited.
- **Nonfinancial information** – Many recorded monetary amounts are closely related to non-monetary information that is generated by personnel independent of the accounting function. When fraudsters have recorded fictitious sales, the non-monetary activity (production and shipping, building permits, contracts, etc.) to support the sales often did not exist. Even in a non-fraud situation, it is better to look outside the financial department to find answers. For example, a bookkeeper who mis-posts SG&A expense to cost of sales might explain it as increased production, while the production manager knows the output has actually gone down.
- All of these sources increase the likelihood that the analytical procedures will be effective.
- **Whether analytical procedures will replace all or some of detailed tests** – The vast majority of small business audits are designed to obtain all audit evidence from substantive tests. Both analytical procedures and detailed tests are substantive tests. Therefore, theoretically, the evidence may be obtained entirely from either substantive analytical procedures or detailed tests. In most audits, it is most likely that assurance will be obtained from a combination of the two because substantive analytical procedures are not sufficient evidence for significant risks.

EXAMPLE

Accounts receivable on the balance sheet is actually a combination of "gross" receivables and an allowance for uncollectible accounts, such as:

Accounts receivable (net of $40,000 allowance for uncollectible accounts) $856,420

Understanding accounts receivable on the balance sheet requires peeling back a layer. While the reported $856,420 might seem like a straightforward sum, it's actually a net figure, already factoring in an estimated $40,000 for potential bad debts. However, auditors can't simply audit the net amount directly.

Instead, the audit approach splits into a two-pronged attack:

1. *Diving into the Gross Amount*: Using detail tests like confirmations and cutoff procedures, auditors review the larger, unadjusted figure of $896,420, the "gross"

accounts receivable. This examination ensures the existence and completeness of every penny owed, leaving no room for phantom invoices or missing receivables.

2. *Assessing the Allowance*: While the gross amount provides a the total debt owed, the $40,000 allowance needs a different kind of assessment. Here, auditors rely on substantive analytical procedures, like analyzing historical bad debt trends and comparing the allowance to industry benchmarks. This analysis aims to determine whether the estimated bad debt cushion is truly adequate, or if it needs a reality check and potential adjustment.

By reviewing both the gross and the estimated, auditors paint a more accurate picture of accounts receivable, ensuring the financial statements reflect not just what's expected, but what's truly owed. This comprehensive approach safeguards against hidden risks and provides stakeholders with a clearer view of the company's financial health.

EXAMPLE

Throughout the year, sales verification adheres to a robust framework of substantive analytical procedures, employing trend analysis and ratio comparisons to assess overall performance. This is complemented by invoice sampling, rigorously traced to shipping documentation or cash receipts for meticulous transaction validation. However, year-end sales warrant heightened scrutiny due to the amplified risk of cutoff discrepancies, where transactions near the reporting date may be misattributed to incorrect periods. Additionally, fraud risk factors inherent in year-end pressure may incentivize manipulation of sales figures.

Consequently, comprehensive vouching procedures are implemented for a pre-determined period surrounding the financial statement date. This entails meticulous examination of invoices, shipping documents, and customer interactions to ensure accurate sales recognition and mitigate the aforementioned risks. Through this proactive approach, we safeguard the integrity and reliability of our financial statements during the critical year-end period.

- **Client explanations for differences from expected amounts must be substantiated with additional audit evidence**—To substantiate a client's explanation, the following actions should be considered by the auditor:
  - Inquiries of customers, suppliers, lenders, or others outside the client's organization
  - Inquiries of non-accounting or nonfinancial personnel within the client's organization
  - Audit evidence obtained from other tests performed
  - Reviewing third-party documentary evidence

NOTE TO PARTICIPANTS: Peer reviewers continue to indicate that substantive analytical procedures are frequently misapplied. The issue seems to be a misunderstanding among some practitioners as to the substantive analytical procedures **application and documentation requirements**. As indicated in AU-C 520:

The auditor should develop an **expectation** *of recorded amounts or ratios and evaluate whether the expectation is sufficiently precise to identify a misstatement that, individually or when aggregated with other misstatements, may cause the financial statements to be materially misstated. These expectations should be developed from the auditor's understanding of the client, the client's industry, the client's competitive situations, changing product mix, new debt arrangements, changing regulatory and tax laws, new accounting standards as well as any operational changes that may have taken place at the client during the reporting period. It would be inappropriate to simply use last year's actual as this year's expectation as some CPAs do.*

Substantive analytical procedures **documentation** *should include:*

- The expectation and the factors considered in its development when the expectation or those factors are not otherwise readily determinable from the audit documentation
- Results of the comparison of the expectation to actual results
- Any additional auditing procedures performed relating to the investigation of fluctuations or relationships that are inconsistent with other relevant information or that differ from expected values by a significant amount (outside of the acceptable materiality range) and the results of such additional procedures performed

Workpapers or evidence must be created for the above documentation requirements. Some practitioners believe that if they already know the expectations based on prior knowledge and experience, they do not have to document these expectations; **this is not correct.**

Remember, if it's not documented, the assumption is that the procedure was not performed.

EXAMPLE

Our prior audits established a baseline: 8% commissions on roughly half the client's sales accurately estimated their commission expense. This year, however, a significant variance demands our attention. The client attributes this anomaly to an intensified West Coast sales push, relying on independent distributors with an 12% commission structure. While this explanation warrants investigation, rigorous audit procedures are necessary to verify its veracity and quantify its impact. We must meticulously inspect relevant documents, scrutinize regional sales breakdowns, and perform precise calculations to determine whether the West Coast initiative fully explains the observed discrepancy. Should it fall short, further investigative measures are imperative to unearth any additional contributing factors. Only through meticulous and comprehensive diligence can we ensure the full picture is revealed, leaving no stone unturned in the pursuit of accuracy.

NOTE TO PARTICIPANTS: The investigation of the difference involves procedures equivalent to substantive detail tests of the difference.

QUESTION FOR DISCUSSION

Analytical Procedures as Tests for Understatement

Tests of accounts receivable are usually directed more toward detecting overstatements than understatements. Consequently, these procedures give some assurance that sales are not overstated.

Describe some analytical procedures that would be effective in testing sales for understatement.

SOLUTION TO QUESTION FOR DISCUSSION

Analytical Procedures as Tests for Understatement

Some analytical procedures that can be effective in testing sales for understatement include:

1. **Ratio Analysis:**
   - **Gross Profit Percentage**: Compare the gross profit percentage for the current period to prior periods, industry benchmarks, and expectations based on cost fluctuations. A significant decline could indicate understated sales or overstated expenses.
   - **Sales Returns and Allowances to Sales Ratio**: Monitor this ratio for unusual increases, which might suggest excessive returns or unauthorized discounts, potentially hiding understated sales.
   - **Accounts Receivable Turnover Ratio**: A slower turnover than expected could signal understated sales or overstated accounts receivable.
   - **Days Sales Outstanding (DSO)**: Longer DSO than usual might point to delayed recording of sales or problems with receivables collections.
2. **Trend Analysis:**
   - Examine sales trends over time, considering seasonality and economic factors. Unexpected dips or inconsistencies could warrant further investigation.
   - Analyze sales by product line, customer type, or geographic region to identify any unusual patterns or variations that might suggest understatement.
3. **Reasonableness Tests:**
   - Compare recorded sales to non-financial data, such as:
     - Production capacity and output
     - Inventory levels and movement
     - Shipping records and delivery logs
     - Customer orders and contracts
     - Industry trends and market conditions
   - Significant discrepancies could raise concerns about understated sales.
4. **Statistical Analysis:**
   - Use statistical techniques, such as regression analysis or Benford's Law analysis (covered later), to detect unusual patterns or outliers in sales data that might indicate understatement.
5. **Other Procedures:**
   - **Review Sales Cutoff**: Examine sales transactions around the end of the reporting period to ensure proper cutoff and prevent early or late recognition of sales.
   - **Reconcile Sales to Accounts Receivable**: Compare recorded sales to changes in accounts receivable to identify potential discrepancies.
   - **Examine Shipping Documents**: Review shipping documents, such as bills of lading, for unrecorded sales.
   - **Analyze Cash Receipts**: Investigate significant delays between sales and cash receipts, which could suggest manipulation of sales timing.
   - **Perform External Confirmations**: For material accounts receivable balances, consider confirming sales with customers directly.

PRACTICE POINT

Analytical procedures alone cannot definitively detect understatement of sales. They serve as a starting point to identify potential areas of concern that may warrant further investigation through substantive testing of transactions and balances.

Developing Expectations

The most common analytical procedures techniques for developing expectations for applying substantive analytical procedures are:

- Period-to-period comparisons
- Analysis of relationships among financial statement accounts
- Comparison to industry statistics
- Analysis of financial data using nonfinancial data
- Comparisons to anticipated results
- Use of ratios

Whenever comparisons are made, it is important to note that external factors can have a significant impact on a company's business and should be considered in developing expectations and evaluating variances. Some of these factors and examples include:

- **Industry developments**—Commodity prices, impact of imports, technological factors, consumer trends.

  Commodity Prices:

  - **Jewelry Industry**: How would a sudden spike in diamond prices affect the engagement ring market?
  - **Agriculture**: What happens to local farmers' profits when grain prices plummet due to a bumper harvest in a major competitor nation?
  - **Energy Sector**: How does the global shift toward renewable energy sources impact the demand (and revenue) of traditional oil and gas companies?

  Impact of Imports:

  - **Automotive Industry**: How does an influx of cheaper, imported cars affect domestic car manufacturers and their employees?
  - **Fashion Retail**: How do local clothing boutiques compete with the vast selection and low prices offered by online retailers like Amazon?
  - **Manufacturing**: How does the offshoring of production to countries with lower labor costs affect job markets in developed nations?

  Technological Factors:

  - **Healthcare**: How does the adoption of artificial intelligence in medical diagnosis change the role of doctors and nurses?
  - **Education**: How do virtual reality and online learning platforms disrupt traditional classroom settings and educational methods?
  - **Finance**: How do blockchain technologies like cryptocurrency impact the stability and accessibility of financial systems?

Consumer Trends:

- **Streaming Services**: How does the surge in popularity of streaming platforms like Netflix and Spotify affect traditional media industries like cable TV and movie theaters?
- **Plant-Based Food**: How does the growing trend of vegetarianism and veganism impact the meat and dairy industries?
- **E-commerce**: How does the convenience of online shopping change consumer behavior and shopping habits?

These are just a few examples, and the possibilities are endless! By framing industry developments as real-world scenarios and questions, you can spark curiosity, encourage critical thinking, and gain a deeper understanding of the complex forces shaping different industries.

- **Economic factors**—Inflation, recession, interest rates.

  Inflation:

  - **Retailers**: How does soaring food inflation impact grocery store profit margins and consumer buying habits?
  - **Wage earners**: When salaries fail to keep pace with rising consumer prices, how does it affect household budgets and financial well-being?
  - **Central Banks**: In an inflationary environment, what delicate balancing act do central banks face when raising interest rates without triggering a recession?

  Recession:

  - **Auto Industry**: How does a decline in consumer confidence during a recession impact car sales and production levels?
  - **Airlines**: During an economic downturn, how do airlines navigate the drop in travel demand and stay afloat?
  - **Small Businesses**: How can small businesses survive and even thrive during a recession when facing reduced consumer spending and access to credit?

  Interest Rates:

  - **Real Estate Market**: How does a rise in interest rates affect housing affordability and the demand for mortgages?
  - **Stock Market**: When interest rates go up, how does it impact investor sentiment and the performance of different stock market sectors?
  - **Student Loans**: How do rising interest rates burden graduates with growing debt and impact their economic mobility?

  Remember, these factors do not exist in a silo and can be combined to create even more nuanced questions. For example:

  - **Mortgage Delinquencies**: When inflation pushes up housing costs and interest rates rise, how does it contribute to the recent significant increase in mortgage defaults, and what ripple effects does this have on the broader economy? What happens to a financial institution when mortgage defaults significantly increase as they have recently?

- **Lending environment—**Cycles of "loose" vs. "tight" credit.

  As examples, the auditor can consider the following:

  - **Fluctuation in Credit Conditions**: Understanding how the economic aspect of changing loan availability impacts the client.

- **Shifting Risk Appetite of Lenders**: Highlighting and understanding the underlying rationale behind stricter or looser lending standards and its impact on the client.
- **Dynamics of Monetary Policy**: Focusing on the role of central banks and government regulations in shaping the lending environment and its impact on the client.

Example: In a period of tight credit, a client's collections on accounts receivable may deteriorate because its customers are having trouble getting working capital loans.

- **Interdependencies**—Impact on a company of changes at customers and vendors.

  As examples, the auditor can consider the following:

  - **Customer Financial Health**: How a client's financial struggles, like declining sales or credit issues, can impact a company's revenue, receivables, and overall profitability.
  - **Vendor Performance**: How changes in a supplier's reliability, delivery times, or pricing can disrupt a company's production, inventory management, and customer fulfillment.
  - **Ecosystem Dynamics**: Analyzing the interwoven nature of industry trends, customer behavior, and supplier capabilities, and anticipating their combined impact on a company's operations.

- **Legislative changes**—Regulated industries, tax changes.

  Regulation:

  - **Deregulation Disruption**: How does the dismantling of industry regulations reshape the competitive landscape and impact established players like utilities, airlines, or telecommunications companies?
  - **Compliance**: When regulatory landscapes shift, how do companies in affected industries adapt their operations and navigate the ever-changing compliance hurdles?
  - **Innovation**: Do loosened regulations unlock a wave of innovation in previously restricted industries, or do established giants simply consolidate their power?

  Taxation:

  - **Sinful Revenue Streams**: How do targeted tax increases on "sinful" goods like cigarettes or sugary drinks affect consumer behavior, industry profits, and public health initiatives?
  - **Fiscal Jigsaw Puzzle**: When governments tinker with tax structures, how do the shifting incentives cascade through different sectors of the economy, impacting businesses, consumers, and overall economic activity?
  - **Technological Tax Traps**: Can traditional tax frameworks effectively capture the revenue streams generated by emerging technologies like cryptocurrency or the gig economy?

  Examples:

  - **Utility Deregulation**: When a once-monopolized utility faces competition, how does it change its pricing strategies, customer service approach, and investment priorities?
  - **Cigarette Tax Hike**: In response to a significant tax increase on cigarettes, does a vending company shift its product mix, adjust prices, or explore alternative revenue streams?

  By framing legislative changes as impactful questions, you can spark curiosity, encourage critical thinking, and gain a deeper understanding of the complex forces shaping your client's industry and their response to regulatory and fiscal shifts.

- **Accounting changes**

  Example: What happens to performance ratios when ASC 842 Leases is applied to financial statements prepared in accordance with generally accepted accounting principles (GAAP)? For instance:

  – How will the adoption of ASC 842 Lease accounting standards affect companies' reported debt-to-equity ratios and leverage metrics?

  – Will new lease accounting rules potentially distort profitability ratios like return on assets and return on equity, and if so, what adjustments might be needed for accurate comparisons?

  – What strategies can companies employ to mitigate the potential impact of ASC 842 on their financial disclosures and investor communication?

The auditor's objective is always the same: to develop a reliable estimate for the recorded amounts. Therefore, the choice of method is based on determining which approach, or combination of approaches, will result in the most reliable estimates. Each method is briefly reviewed below.

1. **Period-to-period comparisons** – This is perhaps the most common analytical procedures used by auditors. It consists of analyzing changes in an account balance over time. For this approach to be meaningful:
   - Stable relationships must exist or changes from period to period must be incorporated into the trend
   - Changes in the client's business must be incorporated to identify amounts where consistency is not expected
   - At least three periods should be compared, to identify trends and isolate aberrations
   - Comparisons should incorporate disaggregated data, to help isolate the reasons for unexpected differences

EXAMPLE

Your client is a local service station. It sells gas, has a small convenience store, and is one of the few in the area that actually repairs cars. The following is a condensed trend of the summary of operations:

	X1	X2	X3
Sales	$2,300,000	$2,714,000	$3,202,520
Cost of Sales	1,909,000	2,252,620	2,658,092
Gross Profit	$391,000	$461,380	$544,428
Accounts Receivable	$368,000	$434,240	$512,403
Accounts Payable	$297,000	$350,460	$413,543

With this type of entity, performing aggregated analytical procedures may not provide valid conclusions. It is unlikely that the gross profit for gasoline, food items and repairs are the same. Suppose gross profits vary based on product line:

		X1	X2	X3
Revenues:	Gasoline Sales	$1,380,000	$1,628,400	$2,562,016
	Repairs	690,000	814,200	480,378

	Other	230,000	271,400	160,126
		$2,300,000	$2,714,000	$3,202,520
Cost of Sales:	Gasoline	$1,242,000	$1,465,560	$2,305,814
	Repairs	483,000	569,940	336,265
	Other	184,000	217,120	16,013
		$1,909,000	$2,252,620	$2,658,092
Gross Profit:	Gasoline Sales	$138,000	$162,840	$256,202
	Repairs	207,000	244,260	144,113
	Other	46,000	54,280	144,113
		$391,000	$ 461,380	$544,428

By looking at the **disaggregated amounts**, auditors can develop independent expectations for meaningful comparisons.

As mentioned above, analytical comparisons are more useful if we (a) utilize thresholds for amounts to investigate/explain, and (b) quantify the impact of the explanations we develop. Threshold amounts should incorporate materiality and risk factors.

This approach provides a straightforward way to address:

- When must I investigate a difference?
- How much of the difference must I explain before I can stop?

NOTE TO PARTICIPANTS: Fluctuation analysis alone is insufficient for identifying anomalies. Unexpected variations compared to projections, not just historical data, should raise concerns. Consider the accountant's understanding of anticipated business changes when evaluating these variations. Remember, the closer a difference is to the acceptable margin of error, the higher the risk of mistakes or even fraud.

EXAMPLE

Your firm's policy sets a 20% planning materiality threshold for substantive analytical procedures. You're auditing a manufacturing company with materiality set at $50,000. You discover that the company invested in a new production line this year, expected to increase raw material usage by 10%. Reviewing the inventory account, you notice a decrease of $7,000 compared to the prior year.

The $7,000 decrease appears insignificant, being less than 20% of materiality. However, you factor in the expected 10% increase in raw material usage due to the new production line. This means the expected inventory balance should have been higher, not lower, than the previous year. Therefore, the combined fluctuation of a $7,000 decrease plus the expected 10% increase warrants further investigation.

Ignoring the expected change due to the new production line could mask potential misstatements in the inventory account. The combined fluctuation, exceeding the expected change, suggests a larger discrepancy requiring further inquiry and investigation.

EXAMPLE

	X3	X2	X1
Office payroll expense	$280,000	$210,000	$198,000

$$\frac{.75 \times \$60{,}000}{3} = \$15{,}000$$

The above information was obtained where planning materiality is $60,000, tolerable misstatement is calculated as 75% of planning materiality, and confidence factor is 3. The firm's policy is to investigate fluctuations exceeding an individually significant item, which the firm calculates as:

The auditor interviews the client's controller and payroll supervisor and obtains information to quantify their explanations as follows:

Increase from X2 to X3	$70,000
Hired a new credit manager (new position) at annual salary of $50,000 on Apr. 1 ($50,000 x ¾)	$37,500
Awarded raises averaging 4% on July 1 ($210,000 x .04)	8,400
Replaced A/R clerk earning $24,000 with another earning $20,000 on Oct. 1(-$4,000 x ¼)	(1,000)
Had both A/R clerks working during 2 weeks training ($20,000 x 2/52) that preceded the official start date of the new clerk	769
Awarded $5,800 bonuses to accounting department for first time	5,800
Temporary help mis-posted to this account (to PAJE 9)	8,300
Amount explained	$59,769
Unexplained difference (below $15,000 threshold)	10,231
Total increase	$70,000

Note the following aspects of this illustration:

- Quantifying the effects of explanations will avoid "wishy-washy," ineffective analytics. It also enhances quality control and workpaper review.
- Explanations should reflect the whole story. Note the **decrease** was included (although small), even though the accountant was explaining an overall increase. Most fluctuations are the net amount of various increases and decreases. Identifying one and not the other can result in auditor bias and the drawing of erroneous conclusions.
- Note the increased likelihood of finding misstatements when we seek out more and more information to explain an adequate portion of the variance. In this case, the accountant determined that there was a mis-posting and referenced it as a proposed entry to correct the misstatement.
- Using a threshold not only identifies amounts requiring further investigation; it also lets us finish faster. Once we bring the unexplained difference below the threshold, we can STOP.
- The differences explained must be verified with audit evidence (payroll records, agency fees paid, etc.) since inquiry alone is not sufficient.

- Note that the average raises of 4% that were awarded on July 1 are not prorated for a portion of the year in this example. The reason for this is that the auditor assumed that raises were awarded each year on July 1. When this is the case, it means that the prior year's salaries ($210,000 in the example) are comprised of a first half at a lower aggregate amount and a second half reflecting the raises for that year.
- One may question why certain very small amounts are even included in this analysis, such as the item for $769. In the real world, when clients try to explain fluctuations, they will wrack their brains coming up with justification for recorded amounts. Some of their comments will translate to small amounts, but the accountant may not know this until the explanations are **quantified.**
- Auditors interpret the unexplained difference remaining ($10,231 in the example) in various ways. Some believe it should be treated as an error, no matter how small, because it was not tested. Others believe a **reasonableness test incorporating materiality has been met "without exception."** Many auditors prefer the latter because any other accounts with less than a $15,000 change would not be regarded as containing errors.
- As noted in paragraph 1.41 of the Analytical Procedures guide, no further investigation is necessary if the difference is less than the acceptable threshold. However, if the auditor notes a suspicious or unusual pattern of variances, even immaterial ones, the potential impact on the engagement should be considered, and additional work performed if necessary. Note: As the difference approaches tolerable misstatement, the risk of error or fraud in the assertion or account balance also increases.
- This approach would have a better chance of finding an understatement in this account than performing detail tests involving vouching payroll transactions would. For example, if the balance should have been even higher than it is, the accountant would find more than $70,000 in increases during his/her work. Vouching transactions that comprise the recorded balance is primarily an existence (overstatement) test and would be less likely to detect a missing item.

2. **Analysis of relationships among financial statement accounts (reasonableness testing)**
   - This approach uses known information (financial and/or nonfinancial) to develop an expectation.
   - Relationship analytical procedures rely on the auditor's knowledge of the client's operations, industry, and accounting practices to develop expectations related to the client's account balances.
   - When changes have occurred at the client from period to period, the auditor must develop assumptions for each key factor supporting his/her expectation. These assumptions enable the auditor, using relationship or reasonableness testing, to develop better and more-focused expectations than those developed from a trend analysis when the only key factor is prior periods.

One of the main premises permitting the use of analytical procedures is that in a double entry bookkeeping system, there is an interrelationship among accounts. By using this approach rather than a two-dimensional approach, precision will be increased. For example:

- If sales increase, the following should be equally affected:
  - Commission expense should increase.
  - Salary expense should increase.
  - Inventory levels should go down or purchases or production should go up.
  - Shipping costs should increase.

- If wages increase, the following should be affected:
  - FICA and other related items should increase.
  - Other benefits such as pension expense should increase.
- If net income increases, taxes should increase.
- Too often we perform these procedures only on two related accounts, such as sales and receivables, which have limited usefulness. A far better approach is to consider all amounts that are interrelated before we develop expectations for recorded amounts.

QUESTIONS FOR DISCUSSION

Identify potential effects on related financial statement amounts of the following economic changes.

High turnover of employees during the current year.

An increase in the price of copper from $3.00 to $3.40 per pound, when your client is a wire and cable manufacturer.

SOLUTION TO QUESTIONS FOR DISCUSSION

Identify potential effects on related financial statement amounts of the following economic changes.

a. High turnover of employees during the current year.

High employee turnover during the current year can have a variety of potential effects on related financial statement amounts, both positive and negative. Here are some of the key areas to consider:

Income Statement:

- **Increased recruiting and training costs**: Frequent hiring replacements necessitate additional expenses for advertising, interviewing, screening, and onboarding new employees. Additionally, training these new hires might require dedicated resources and investment.
- **Decreased productivity and efficiency**: New employees take time to become fully productive and learn company processes. This can lead to temporary dips in output, missed deadlines, and potential errors, impacting revenue and potentially increasing operational costs.
- **Loss of institutional knowledge**: Departing employees, especially experienced ones, take their knowledge and expertise with them. This can be detrimental to projects and overall business operations, potentially leading to lost revenue or increased costs to replace lost knowledge.
- **Potential for severance costs**: Depending on company policy and contractual obligations, employee departures might incur severance pay or other termination costs, impacting the current year's expenses.
- **Payroll taxes:** Payroll taxes would be impacted due to calculation of unemployment and other amounts based on wages up to a maximum.
- **Employee benefit expenses:** Accruals for employee benefits would likely be less, as fewer employees would qualify for paid vacation, retirement plan participation, and so on.

Balance Sheet:

- **Higher accounts receivable**: If turnover impacts collections or customer service negatively, accounts receivable might rise due to delayed payments or unfulfilled deliveries.
- **Increased inventory**: Productivity disruptions from new hires might lead to temporary inventory build-up as production or sales fluctuate.
- **Potential write-offs of intangible assets**: If certain projects rely heavily on the knowledge of departed employees, the value of related intangible assets (e.g., software, R&D) might need to be reassessed and potentially written down.

Cash Flow Statement:

- **Fluctuations in operating cash flow**: The cash flow impacts of the above-mentioned changes (e.g., increased expenses and delayed receivables) will affect the timing and amount of cash generated from operations.
- **Potentially higher financing costs**: If increased expenses or decreased revenue negatively impact profitability, the company might require additional financing, which could involve higher interest rates.

Additional Considerations:

- **Severity and timing of turnover**: The extent and timing of employee departures will play a significant role in the severity of the financial statement impacts. Frequent turnover throughout the year is likely to have a more noticeable effect than a few departures late in the year.
- **Industry and company size**: The financial statement impacts will also vary depending on the industry and the size of the company. Turnover can be more disruptive and costlier in certain industries with complex processes or highly specialized skills. Smaller companies are typically more vulnerable to the loss of key employees.

It's important to note that these are just potential effects, and the actual impact on financial statements will depend on the specific circumstances of each situation. A thorough analysis of the specific reasons for turnover, the types of roles impacted, and the company's overall financial health is crucial for accurately assessing the financial statement implications.

b. An increase in the price of copper from $3.00 to $3.40 per pound, when your client is a wire and cable manufacturer.

An increase in the price of copper from $3.00 to $3.40 per pound can have a significant impact on a wire and cable manufacturer's financial statements. Here are some potential effects on related financial statement amounts:

Income Statement:

- **Increased cost of goods sold (COGS)**: Copper is a major raw material in wire and cable production. The price increase directly translates to higher COGS, putting pressure on gross margins. This could lead to:
  - **Decreased gross profit**: If the manufacturer cannot raise selling prices proportionally, the price increase in copper will directly eat into their gross profit.
  - **Compression of profit margins**: Even if prices are adjusted, the increase in material cost may not be fully recovered through price increases, leading to compressed profit margins.
- **Potential for inventory write-downs**: If finished goods were produced before the copper price increase, their value may not reflect the new higher cost of production. This could necessitate inventory write-downs, further impacting profits.

Balance Sheet:

- **Increased inventory valuation**: If the manufacturer holds significant inventory of raw copper or finished goods, the higher price per pound will increase the value of its inventory on the balance sheet. However, this may be a temporary effect if the inventory is sold at lower margins due to the increased cost.
- **Potentially higher accounts payable**: Depending on the payment terms with copper suppliers, the manufacturer might experience an increase in its accounts payable due to the higher cost of purchased copper.

Cash Flow Statement:

- **Decrease in operating cash flow**: The combined effect of higher COGS and potentially lower gross profit (especially in the short term) can lead to a decrease in operating cash flow. This can impact the company's ability to reinvest in operations or meet financial obligations.

- **Potential for increased borrowing**: If the decrease in operating cash flow is significant, the manufacturer might need to rely on increased borrowing to meet their financial needs, impacting future interest expenses.

Additional Considerations:

- **The competitive landscape**: The ability to pass on the increased cost of copper to customers through price increases depends on the competitive landscape in the wire and cable industry. If competition is fierce, the manufacturer might have limited ability to raise prices, further squeezing their margins.
- **Hedging strategies**: Some manufacturers use hedging strategies to mitigate the risk of volatile copper prices. If your client has such strategies in place, the impact of the price increase might be partially offset.
- **Long-term implications**: While the short-term impacts might be negative, a sustained increase in copper prices could benefit the wire and cable industry by reducing scrap supply and potentially leading to higher selling prices in the long run.

  It's important to remember that these are potential effects, and the actual impact on your client's financial statements will depend on various factors such as their specific production processes, inventory levels, pricing strategies, and market conditions. A thorough analysis of your client's financial situation and industry context is crucial to accurately assess the impact of the copper price increase.

CASE STUDY 1

Analytical Procedures to Test Warranty Accrual

The information that follows was derived from the records of a client who provides a one-year warranty on air conditioning systems it installs.

All amounts have been audited in prior or current years except for the "Accrued Warranty Payable" account for this year (year 20X6).

Develop a substantive analytical procedures to derive an estimate of the warranty accrual at year-end.

Accrued Warranty Payable Account

20X4		**20X5**		**20X6**	
	39,000 beg.		41,000 beg.		37,000 beg.
46,000	48,000	54,000	50,000	51,000	56,000
	41,000 ends		37,000 ends		42,000 ends

(Summary of Entries)

Sales Data	
20X3	$880,000
20X4	$920,000
20X5	$950,000
20X6	$940,000

SOLUTION TO CASE STUDY 1

Analytical Procedures to Test Warranty Accrual

Develop a substantive analytical procedure to derive an estimate of the warranty accrual at year-end.

Actual costs of warranty repairs are the debits to the warranty accrual. These costs relate to sales of the prior year, based on a one-year warranty period.

An average of warranty costs as a percentage of prior year sales can be used to estimate the costs to accrue for year 20X6 sales as follows:

	Actual Warranty Costs	Prior Year Sales	Costs as % of Sales	
20X4	$46,000	$880,000	5.23%	
20X5	54,000	920,000	5.87%	3 year average
20X6	51,000	950,000	5.37%	= 5.49%

Estimated warranty accrual = 5.49% ($940,000) = $51,600 (rounded)

Client's preliminary balance	$42,000
Difference to pass or adjust	$9,600

Note: It appears, based on consistency of calculated percentages, that a similar difference was passed in prior years.

In addition, the auditor should "confirm" that there have been no changes in warranty terms and coverage from prior years before developing the estimate.

Other substantive analytical procedures that can be used to derive an estimate of the warranty accrual at year-end include:

1. **Review historical trends and ratios:**
   - Analyze the historical relationship between warranty claims and sales, units sold, or production volume.
   - Calculate the warranty expense as a percentage of sales for prior periods and compare it to the current year's percentage.
   - Investigate any significant changes in these relationships that might indicate a change in the expected level of warranty claims.
2. **Benchmark against industry averages:**
   - Compare the company's warranty accrual to industry averages or benchmarks for companies of similar size and type.
   - Consider factors such as product type, warranty terms, and customer demographics when making comparisons.
3. **Analyze warranty claim patterns:**
   - Review the pattern of warranty claims over time, including the frequency, severity, and timing of claims.
   - Identify any trends or patterns that might suggest changes in the expected level of future claims.
   - Consider factors such as product age, usage patterns, and environmental conditions.

4. **Consider changes in warranty terms or product design:**
   - Evaluate any changes in the company's warranty terms or product design that might affect the expected level of warranty claims.
   - Assess whether any changes have been made to reduce the likelihood or severity of warranty claims.
5. **Analyze warranty reserve data:**
   - Review the company's data on warranty reserves, including opening balances, additions, claims paid, and adjustments.
   - Assess the reasonableness of the assumptions used to estimate the warranty accrual.
6. **Incorporate external factors:**
   - Consider external factors that might affect warranty claims, such as changes in technology, regulatory requirements, or customer expectations.
7. **Age the warranty accrual:**
   - Analyze the aging of the warranty accrual to estimate the portion that is likely to be paid in the near future.
   - Consider factors such as the average time to claim and the expected life of the products covered by the warranty.
8. **Reconcile to prior-year accrual:**
   - Reconcile the current-year warranty accrual to the prior-year accrual, adjusting for changes in sales, warranty terms, and other relevant factors.
9. **Conduct sensitivity analysis:**
   - Perform sensitivity analysis to assess the impact of different assumptions on the estimated warranty accrual.
10. **Consider management's estimates:**
    - Review and evaluate management's estimates of warranty costs, considering their methodology and assumptions.

It's important to note that these procedures should be tailored to the specific circumstances of the company and its industry. Auditors may also use other substantive analytical procedures, such as regression analysis or statistical sampling, to derive an estimate of the warranty accrual.

3. **Comparison to industry standards** – Although theoretically an excellent way to obtain independent outside information, this approach may have limited usefulness in small business audits. For example, if a client is an automobile dealer or grocery chain, a comparison of gross margins to industry averages may be extremely useful. However, consider the following situations:
   - Your client, a small manufacturer, bases officer compensation on profits and allocates a portion to cost of goods sold. A comparison of gross profit to the industry would require removing administrative payroll from cost of goods sold.
   - Comparing expenses as a percentage of sales for a small company against industry standards for larger companies will be difficult, because fixed costs tend to be smaller in relation to sales for large companies.
   - The number of product lines and sales mix can often differ, even though companies are in the same industry.

The following are examples of industry sources.

Websites

- http://www.profitcents.com – Online report that can be generated for specific companies
- http://www.bizstats.com – Contains information on financial ratios, business statistics, and benchmarks for over 30,000 industry segments, including sole proprietors
- https://analytics.google.com/analytics – Google Analytics Solutions – Marketing Analytics & Measurement
- https://www.hbr.org/2013/12/analytics-30 – Analytics 3.0 – Harvard Business Review
- https://www.forbes.com/sites/bernardmarr/2016/02/04/the-18-best-analytics-tools-every-business-manager-should-know/ – The 18 Best Analytics Tools Every Business Manager Should Know
- https://www.sas.com – SAS Business Analytics | SAS

NOTE TO PARTICIPANTS:

Use the internet **often** to search for current information.

Published Surveys

- Almanac of Business and Industrial Financial Ratios.
- https://www.irs.gov/statistics/soi-tax-stats-statistics-of-income – Provides over 20 ratios and key financial statistics derived from the most recent data available from the IRS's Statistics of Income Division (SOI) based on tax returns.
- Manufacturing USA: Industry Analyses, Statistics, and Leading Companies – Detroit: Gale Research, Inc. Provides data on employment, production, financial ratios, etc., for 450 types of manufacturers.
- RMA Annual Statement Studies – Contains ratios and data assembled from 580 industries contributed by RMA member banks. It also includes a bibliography of sources of financial ratios for individual industries.
- Industry Norms and Key Business Ratios – Dun & Bradstreet – Provides 14 ratios for over 800 industries.

Trade Associations

Although not a direct source of information, directories for trade associations can be invaluable in identifying the trade group, classified by industry, with addresses and phone numbers. Most trade associations have publications on financial performance and are very willing to share information.

- Encyclopedia of Associations – Gale Research
- National Trade and Professional Associations of the United States

In addition, the following two publications can further identify sources of industry information:

- How to Find Information About Companies: Washington Researchers
- Sources of Information for Industry Analysis: Baker Library, Harvard Business School

NOTE TO PARTICIPANTS:

Most practitioners have more than one client in a particular industry. This is an excellent source of information and especially meaningful because they tend to be:

- Similar size companies
- Current information (older than 3 years may be useless)
- Located in the same geographic area
- Comparable because the accountant would be aware of any unique or unusual items affecting comparability

Caution – Consider our ethical requirements concerning client confidentiality before making use of information obtained from one engagement in another engagement.

CASE STUDY 2

Tar Heel Community Hospital

Assume that Tar Heel Community Hospital (THCH) is your client. Understanding your client's position within the healthcare landscape is crucial for optimizing performance and achieving excellence. To obtain a comprehensive picture on the environment in which THCH is operating in, the audit team have compiled relevant industry statistics. These metrics serve as a valuable benchmark, enabling the audit team to analyze THCH's performance against industry averages. The results of your procedures can also be used to add value to the client relationship by illustrating where they are performing above or below industry standards ("benchmarking").

Required: Review the industry statistics that follow and compare them with the statistics provided for Tar Heel Community Hospital.

Statistic (Performance Measure)	Type	20X3	20X4	20X5	Tar Heel
Current ratio	Liquidity	2.26	2.30	2.26	**3.00**
Days in net accounts receivable	Liquidity	62.55	63.03	66.84	**61.25**
Average payment period	Liquidity	52.80	53.36	52.21	**53.09**
Outpatient gross revenue as a percentage of total gross patient revenue	Patient & Payor Mix	40.58	42.30	43.56	**34.96**
Deductions from gross patient revenue	Profitability	37.14	38.40	40.06	**38.50**
Operating profit margin	Profitability	6.23	6.25	4.22	**6.35**
Full time equivalent personnel per adjusted average daily census	Productivity	4.81	4.91	4.82	**5.82**
Occupancy rate, acute care	Capacity/ Utilization	45.22	44.23	45.73	**53.04**
Average length of stay – acute care – Medicare	Capacity/ Utilization	5.66	5.44	5.27	**4.51**
Average length of stay – acute care – Non-Medicare	Capacity/ Utilization	3.16	3.09	3.18	**3.25**
Long-term debt to net fixed assets	Capital Structure	.55	.56	.60	**0.85**
Debt service coverage ratio	Capital Structure	5.85	6.99	6.03	**6.02**
Long-term debt to capitalization	Capital Structure	.30	.28	.30	**0.45**
Average age of plant – total facility	Capital Structure	6.72	8.70	9.08	**5.34**

CASE STUDY 2 (CONTINUED)

Tar Heel Community Hospital

- **Current ratio** – The current ratio is the most frequently examined measure of the liquidity of a hospital. The ratio helps the user of the statements to determine if there is a potential shortage of working capital.
- **Days in net accounts receivable** – A hospital's net patient accounts receivable divided by its net patient revenue times 365. The ratio expresses the number of days of net patient revenue that a hospital has due from its patient billings after all deductions. Favorable values are below the median.
- **Average payment period** – A hospital's total current liabilities times 365, divided by total operating expenses less depreciation. This ratio measures the average amount of time it takes to pay current liabilities. Favorable values are below the median.
- **Outpatient gross revenue as a percentage of total gross patient revenue –** The ratio of outpatient gross revenue at a hospital to total gross patient revenue, expressed as a percentage of gross patient revenue. This ratio approximates the proportion of a hospital's revenue that is attributable to services provided to outpatients. Values below the median may indicate a need to diversify the hospital's sources of revenue.
- **Deductions from gross patient revenue as a percentage** – The total of bad debts, charity care, and contractual allowances as a proportion of gross patient revenue, reflects the type of payor mix at the hospital and its participation in managed care arrangements. A high proportion of deductions may indicate the need for an assessment of the hospital's service offerings, pricing policies, or patient marketing strategies.
- **Operating profit margin** – The operating profit margin is a key measure of profitability.
- **Full-time equivalent personnel per adjusted average daily census** – The total number of full-time equivalent personnel in a hospital divided by the hospital's adjusted average daily census. It is a measure of the staffing level of a hospital and can also be viewed as a measure of the labor inputs being used to provide a day of hospital care. Favorable values are below the median.
- **Occupancy rate** – Ratio of hospital's average daily census of inpatients in acute care beds to the average number of acute care beds in service. It is a measure of the utilization of the capacity of a hospital. Favorable values are above the median.
- **Average length of stay, acute care** – The total number of acute care inpatient days in a hospital divided by the total number of acute care discharges from the hospital. This is a key indicator of utilization and clinical management and can be used to predict the average resources used during a patient's stay in the hospital. Favorable values are below the median.
- **Long-term debt to net fixed assets** – The ratio of long-term liabilities at a hospital to total property, plant, and equipment net of accumulated depreciation. This ratio measures the proportion of fixed assets that has been financed through long-term debt. It is a measure of the financial leverage used by a hospital. Favorable values are below the median.
- **Debt service coverage ratio** – The sum of net income, current depreciation, and interest expense at a hospital divided by the same year's debt service payments. This ratio measures the ratio of a hospital's funds available to pay debt service to the interest and principal payments. It is an important measure of the ability of a hospital to repay debt. Favorable values are above the median.

CASE STUDY 2 (CONTINUED)

- **Long-term debt to capitalization** – The ratio of long-term liabilities at a hospital to the sum of the hospital's long-term liabilities and fund balance. This ratio measures the proportion of a hospital's total capitalization provided by debt. Favorable values are below the median.
- **Average age of plant, total facility** – Total accumulated depreciation on all of the hospital's property, plant, and equipment divided by total current depreciation. It is a measure of the average accounting age of a hospital's capital assets. Favorable values are below the median.

Based on the comparison, what are some things that may be taking place at the hospital?

How can these statistics be used to design a substantive test?

SOLUTION TO CASE STUDY 2

Tar Heel Community Hospital

Required – Review the industry statistics and compare them with the statistics provided for Tar Heel Community Hospital.

1. **Based on the comparison, what are some things that may be taking place at the hospital?**

   Tar Heel Hospital presents a fascinating financial tableau. On the one hand, it gleams with profitability, boasting an operating margin that outshines the industry median and a modern infrastructure indicative of recent investment. Its liquidity ranks high, thanks to excellent cash flow metrics like the current ratio and days in accounts receivable. Yet, beneath this gleaming surface lie potential areas for improvement that could bolster its long-term resilience. One such area is the hospital's heavy reliance on inpatient care. While this model generates healthy revenue in the short term, it exposes Tar Heel to the volatile winds of inpatient reimbursement changes. A strategic shift toward diversifying offerings into outpatient services could provide a much-needed buffer against market shifts and secure the hospital's future.

   Another point of consideration is the staffing equation. Tar Heel's FTE-to-census ratio raises eyebrows, suggesting a potential for cost optimization. Analyzing and streamlining staffing, without compromising the quality of care that defines the hospital, could free up resources for further investment in facilities or personnel development.

   Finally, the issue of patient length of stay, particularly for Medicare patients, begs exploration. While the shorter stays contribute to the bottom line, ethical considerations must be paramount. A close review of discharge protocols and ensuring optimal care remain essential, even if it means slightly longer stays in some cases.

   By attending to these opportunities while nurturing its existing strengths, Tar Heel Hospital can evolve from a financially successful entity to a truly thriving healthcare leader. Embracing a diversified business model, prioritizing cost-effective operations, and upholding patient-centered care will pave the way for a sustainable and impactful future.

2. **How can these statistics be used to design a substantive test?**

   Leveraging industry benchmarks can augment the effectiveness of substantive analytical procedures, particularly in predicting revenue and expense balances. For instance, applying the average industry deduction percentages from revenue, while factoring in volume changes, can assist in forecasting the current year's contractual allowance. Furthermore, it is prudent to ascertain if the hospital's information system generates these statistics. Integrating system-generated statistics, once their underlying controls are tested, can significantly enhance the predictive accuracy of account balances compared to generic industry averages. However, it is crucial to recognize that while analytical procedures play a vital role in unveiling financial trends, they may not be sufficient for high-risk areas like revenue, which often present fraud concerns. In such instances, a comprehensive audit approach that combines insightful analytics with robust tests of controls and detailed substantive procedures is imperative to comprehensively assess the financial landscape and address potential red flags.

4. **Analysis of financial data using nonfinancial data** – Often, data expressed in non-monetary terms can provide strong predictive information for recorded account balances. Finding the data and utilizing it effectively requires an enhanced knowledge of the client (i.e., knowledge "beyond the numbers") and tailoring for each engagement. Additionally, evaluating the results of the analytical procedures requires more professional judgment.

The concept here is that we can get away from numbers that are generated by the accounting/financial people and really analyze operations.

EXAMPLE

For many companies, the sales mix and size of customer orders tend to be consistent over time. This can be especially true of businesses with sales comprised of many relatively small orders.

In such cases the number of shipments can be used as nonfinancial predictive data for sales.

	20X3	20X2	20X1
# sequence used for shipping logs	25316-33855	17109-25315	09652-17108
# of shipments	8,539	8,206	7,456
% increase expected in sales from # of shipments	4%	10%	–

Additional factors would also be incorporated, especially price changes. The auditor may also want to perform procedures to ensure the number sequences are reliable and complete.

EXAMPLE

A frozen-food producer distributes frozen chicken dinners. If the individual unit costs per the packaging are priced out, we might have the following:

Chicken breast	$ .29
Peas	.04
Potatoes	.08
Apple sauce	.06
Packaging	.68
	$1.15

If 1,864,000 units were sold, Cost of Goods Sold should be $2,143,600 (1,864,000 x $1.15). If the product sold for $1.89, Sales should be $3,522,960.

EXAMPLE

Number of personnel: 120 (same as last year)

Units produced: 210,000 (up 20% from last year)

If the same number of employees is turning out 20% more product, one might expect:

- More overtime premium cost
- Larger 401(k) withholding and company match
- Decrease in payroll taxes as percentage of payroll (e.g., more payroll dollars not subject to FUTA and SUTA)
- More workers' compensation insurance (if based on covered payroll including overtime)
- Increased sales
- Increased overhead for costs that vary with production

EXAMPLE

The following are some additional situations where this type of procedure might be most effective:

- Coin-operated laundromat
- Bagel manufacturer
- Sales of beer at a hockey game
- Revenue from union dues
- Room revenue at a hotel
- Restaurant revenue
- Sales of training courses

Nonfinancial information may help to highlight aberrations that are symptoms of fraudulent activity. The CPA must apply adequate skepticism to analytical procedures so that signs of fraud will be recognized as such:

Aberration	Bias in Favor of Client	Skeptical CPA
1. Expense higher than expected	1. Costs went up, or an innocent mis-posting	1. Concealment of theft of assets (DR Expense CR Asset)
2. Inventory lower than expected	2. "Innocent" antics of tax-driven client; no "exposure," as conservative value	2. Tax fraud, materially misstated financial statements
3. A/R higher than expected	3. Collections are deteriorating; larger sales near year-end	3. Invalid sales recorded near year-end to boost profits or meet debt covenants

Note that even if no fraud is involved, the accountant may have recognized an opportunity to provide valuable advice to a client, perhaps even as a consulting engagement.

The next example illustrates that related nonfinancial data must be a **reliable predictor of a balance**. Otherwise, the substantive analytical test will not be effective.

EXAMPLE

You note that payroll expense has increased 10%. You "substantiate" this by noting that the number of W-2 forms processed by the client also increased by 10%. Had you investigated further, you would have learned that there was higher employee turnover this year, so that many W-2 forms were for partial year employment.

Consequently, the substantive analytical procedures was not effective, because the number of W-2 forms was not a reliable basis for predicting payroll expense. In an audit, the auditor will have to perform a detail test (100%, significant items, or sampling) of payroll expense to gather reliable evidence to support the account balance.

EXAMPLE

Use of Nonfinancial Data

Data Inc., a furniture manufacturing business, uses nonfinancial data in a number of ways:

- Weekly, a reconciliation of raw material input (in pounds and board feet of lumber) is made to finished product plus spoilage during the week. A variation of plus or minus ½% is investigated.
- Monthly, the number of shipments times average truck capacity is compared to the sales recognized during the month. A variation of plus or minus 2% is investigated.

- Sales per month by customer are developed and analyzed to determine if any unusual or unexpected variations have taken place.
- Monthly, sales returns by customer are developed and analyzed to determine if any unusual or unexpected variations have taken place.
- Monthly, operating expenses per employee by department are developed and analyzed to determine if any unusual or unexpected variations have taken place.
- A weekly maximum test is utilized for payroll hours per employee, number of trucks to shipments, plant utilization and capacity, and number of shipments to customers. These maximums vary based upon the time of the year.
- Monthly, customer orders to shipments are reconciled. A variation of plus or minus 3% is investigated.
- Monthly, cost of sales in units is reconciled to sales per units.

Nonfinancial measures must be designed on a client-by-client situation. At a minimum though, the following nonfinancial measures should be considered on engagements (best practice, this is not required by the standards):

- Sales or cash flow from operations to number of employees
- Sales or cash flow from operations to available or usable square feet
- Sales or cash flow from operations to number of shipments
- Sales or cash flow from operations to number of customer orders
- Operating expenses per employee
- Cost of services provided per participant

CASE STUDY 3

Using Nonfinancial Data to Perform a Dairy Processor Sales Analysis

Scenario:

- Your client operates a dairy processor. They purchase milk in bulk from a farmers' cooperative and:
  - Pasteurize the milk.
  - Separate and process the milk fat to produce various milk products (skim milk to light cream).
- Milk and cream are packaged in cartons (half-pints to half-gallons). Smaller containers command higher unit sales prices per pound of milk.

Information Gathering:

- Delivery and Sales:
  - Products are delivered by company trucks to schools, institutions, grocery stores, and convenience stores.
  - Each delivery is recorded as a sale based on a driver-prepared sales slip listing all products.
  - Quantities are entered next to each item, and invoices are generated daily from these slips.
- Milk Processing Monitoring:
  - Government inspectors visit monthly and quantify pounds of milk purchased compared to pounds shipped.
  - This analysis identifies "shrinkage" exceeding 2%, indicating potential product discard due to high bacterial levels.
  - These reports are deemed reliable for tracking processed milk product pounds.
- Sales Mix Volatility:
  - Sales mix fluctuates yearly due to customer changes, primarily driven by institutions and chain stores periodically requesting contract bids.

Key Takeaways:

- Sales data comes from driver-prepared slips, potentially creating discrepancy risks.
- Government reports offer independent, reliable data on processed milk pounds.
- Sales mix volatility necessitates consideration of historical data and contract bid information.

Required: Develop a substantial analytical procedure to test revenue from milk sales.

SOLUTION TO CASE STUDY 3

Using Nonfinancial Data

Required: Use the information given to design a substantive analytical procedure for sales.

Estimating revenues for milk products requires accounting for both quantity and price. While reliable data on pounds sold exists, different products and packaging carry varying prices based on fat content and container size.

Determining yearly pounds sold for each product might be inefficient and impractical. Instead, focusing on a weighted average price per pound of milk product sold provides a more efficient and accurate approach.

Here's how one auditor tackled this specific challenge:

1. Selected a random sample of sales slips throughout the year and across all delivery routes, relying on professional judgment instead of rigid formulas.
2. Calculated a weighted average price per pound using invoices and container weights. Prices were cross-checked against established lists and quotes.
3. Multiplied the weighted average price by the total quantity sold and compared it to recorded revenues for consistency.

This case highlights that thorough analytical procedures often involve deeper analysis of specific components, similar to detail tests, to ensure data reliability. For this client, this weighted average price calculation became an annual task. Additionally, year-to-year comparisons could be made to assess price trends for reasonableness.

While this approach took approximately six hours for a $9 million revenue test, it provided excellent coverage and enhanced the overall reliability of the analysis.

Could there be a simpler path for testing? Yes, if sales mix isn't a major concern and reliable historical data is available, a simpler approach might suffice. Comparing the year-over-year relationship between pounds and sales dollars can reveal any significant changes from prior periods, eliminating the need to rebuild an estimate every year. In essence, this case encourages auditors to be flexible and adapt their procedures to fit the specific circumstances, aiming for efficient yet reliable assessments of revenue figures.

> **NOTE TO PARTICIPANTS:** If the auditor evaluates an assertion or account as a significant risk, AU-C 330 does not permit the auditor to use substantive analytical procedures as the only evidence developed to support the assertion or account balance. If substantive analytical procedures are utilized, either tests of controls or other substantive procedures must also be performed.

5. **Comparison to anticipated results** – Many practitioners believe that because their clients do not use meaningful budgets or projections, this type of analytical procedure is not useful. However, the concept of anticipated results applies whenever one could reasonably expect certain things to happen based on their knowledge of operations.

Too often, this approach is applied backwards, which undermines its validity. An accountant mistakenly assumes that "anticipated results" really means "same as last year." Mistakenly, items that change year to year are regarded as variances to investigate, even though appropriate knowledge of the client up front would have identified the changes as being consistent with anticipated results and, thus, not requiring further investigation!

EXAMPLE

Sales for 20X5 were $1,000,000 and sales for 20X6 were $1,365,000. Starting with the assumption that this is a variance requiring an explanation, the auditor frequently explains (rationalizes) that actual sales increased by 36.5%. However, if there had been an actual increase, it could have resulted from a combination of several factors; for example:

Sales quantities increased by 10%	=	$100,000
Prices increased by 26.5%	=	$265,000
	OR	
The number is wrong	=	?

A better knowledge of 20X6 operations obtained up front (planning analytics and performance of other risk assessment procedures) would tell the auditor whether shipments increased 10% and prices increased 26.5%. These changes would be incorporated into an independent expectation for 20X6 sales and then compared to the recorded amount to determine whether, in fact, there is a significant difference between expectation and recorded amount or, instead, the two are reasonably close and no further audit work would be required.

NOTE TO PARTICIPANTS: Always consider the process that the client uses for budgeting and the reliability as a monitoring activity.

6. **Use of ratios** – Ratio analysis assumes the existence of **stable and predictable relationships within the client**. Ratio analysis is normally more effective than simple trend analysis because ratios compare financial information elements within the three basic financial statements that can identify differences from expectations better than a trend analysis of an individual account.

Ratio analysis at an aggregate level is often imprecise, missing differences that are offset by other misstatements. For ratio analysis to be most effective, they should be performed at a disaggregated level—product line, division, geographic location, month, etc.

When auditing sales, for example, the auditor may want to use disaggregated and nonfinancial ratios to obtain evidence concerning the fair presentation of revenue. Assuming auditor or third-party evidence has been obtained or the auditor has tested controls over the revenue cycle and determined they are reliable, the following ratios might be used:

- Sales per month
- Sales per month by customer
- Sales per employee
- Sales per product line
- Sales per square feet
- Sales per shipment
- Sales returns to sales per month
- Sales returns to sales per customer
- Ratio of non-recurring sales to recurring sales

If ratio analysis is to be used in substantive analytical procedures (remember, substantive analytical procedures are optional audit procedures), several issues should be considered.

Market analysis ratios (such as dividend yield, price earnings, or payout ratios) may not enhance the auditor's work for small privately held companies. Instead, the focus should be on cash flow, liquidity, and solvency, in particular the ability to service debt and the "quality" of assets pledged as collateral. If this type of ratio is to be used, adjustments should be made for these components.

Select only a few key ratios and use them to analyze the statements. For example:

- **Accounts receivable and inventory turnovers** – These assets are often key to loan arrangements, and their valuation on the balance sheet is dependent on collectability and salability, respectively.
- **Gross profit ratio** – While unexpected changes in gross profit are a challenge to analyze, this ratio incorporates many important operating aspects of a company. In particular, it can highlight possible misstatements of inventory—often a high-risk audit population.
- **Quality of earnings** – $\frac{\text{Operating Cash Flows}}{\text{Net Income + Depreciation Expense}}$

Estimates, accounting methods, and timing of revenues and expenses determined on an accrual basis affect GAAP earnings. Operating cash flows are unaffected by accounting rules and estimates and tell us whether accrual basis revenues and expenses are being settled in cash. Over time, this ratio should approach 1.

PRACTICE NOTE:

- This ratio is an extremely good indicator of potential misstatement and is recommended for consideration on all audit and review engagements.

Auditors use ratios not just to assess financial health but also to pinpoint areas demanding closer scrutiny. A declining inventory turnover, for example, prompts the auditor to develop procedures to tackle potential overstatement issues, be it in cutoff, obsolescence, or pricing. Remember, relying solely on ratio analysis for substantive testing is risky, and further investigation is often necessary.

The following commonly used ratios are presented for discussion purposes.

> **NOTE TO PARTICIPANTS:** The benefits of using cash flow ratios for "S" corporations and small "C" corporations may be more meaningful than some of the commonly used but not really useful ratios. A few focused ratios may outweigh a large number of "normal" ratios.

Commonly Used Ratios

Liquidity Ratios		
Ratio	**Formula**	**Meaning**
Current Ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	The extent to which current assets cover current liabilities; a surrogate for ability to generate sufficient cash in the short-term to cover obligations as they become due.
Quick Ratio	$\frac{\text{Cash + Cash Equivalents + Net Receivables}}{\text{Current Liabilities}}$	A conservative view of creditors' protection, since it excludes less-liquid assets (inventory and pre-paid). A company is usually in a good liquid position when this ratio is > 1.
Working Capital	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	The extent to which liquid assets exceed current liabilities; provides an indication of ability to generate resources for growth over time.

Efficiency Ratios		
Ratio	**Formula**	**Meaning**
Accounts Receivable Turnover	Net Revenue / Average Accounts Receivable	The number of times receivables turn into cash per year.
Days' Sales in Accounts Receivable	365 Days / Account Receivable Turnover	The average length of time from a sale to cash collection.
Inventory Turnover	Cost of Goods Sold / Average Inventory	The number of times the business liquidated its inventory during the period. Can pinpoint whether too little or too much inventory is carried.
Days' Inventory on Hand	365 Days / Inventory Turnover	The number of days it takes to sell the inventory. Used in conjunction with the accounts receivable collection period to determine the operating cycle.
Operating Cycle	Days in Accounts Receivable + Days in Inventory - Days in Payables	The length of time it takes to convert inventory to cash. If the cycle increases, more working capital must be maintained.
Accounts Payable Turnover	Cost of Goods Sold / Average Accounts Payable	The number of times the company paid off trade payables during the period.
Accounts Payable Days Outstanding	365 Days / Accounts Payable Turnover	Number of days to pay off A/P on average.
Asset Turnover	Net Revenue / Average Total Assets	Measures the effectiveness of generating sales from assets.

Coverage Ratios		
Ratio	**Formula**	**Meaning**
Debt to Equity	Total Liabilities / Stockholders' Equity	An indication of the relationship between the owners' and creditors' positions.
Current Debt to Equity	Current Liabilities / Equity	Compares current debt maturities to equity. A high ratio may indicate the need to restructure short-term debt.
Times Interest Earned	Operating Income / Interest Expense	An indication of how well the company is able to cover interest through earnings.

Profitability Ratios		
Ratio	**Formula**	**Meaning**
Gross Profit Ratio	Gross Profit / Net Revenues	An indication of control over cost of sales and pricing policies.
Profit Margin	Net Income / Net Revenues	Measures "the bottom line" as a percentage of revenues. Other Income Statement subtotals may be used as the numerator, such as operating income or income before taxes.
Operating Expenses to Sales	Operating Expenses / Sales	Measures the efficiency of operations and identifies the reasonableness of the relationship.
Rate of Return on Assets	Net Income / Average Total Assets Or Net Income + After-Tax Interest / Average Total Assets	Earning performance relative to all resources of the business. The second formula removes any "bias" against a company that finances resources with debt rather than equity.

Rate of Return on Equity	Net Income / Average Stockholders' Equity	Earning performance relative to resources contributed by stockholders. When use of leverage is effective, this rate exceeds the return on assets.

Cash Flows Ratios (may be more meaningful than GAAP metrics)		
Ratio	**Formula**	**Meaning**
Quality of Earnings	Operating Cash Flows / Net Income + Depreciation + Any Other Significant Non-cash Items	Over time, should approach 1. Cash flows from operations remove the bias of GAP alternatives, management judgments, and estimates in reported earnings.
Operating Cash Flows to Sales (Cash Flow Returns)	Cash Flows from Operations / Sales	Another measure of earnings quality. Result is compared to net income/sales for consistency.
Debt Coverage	Cash Flows from Operations / Interest Paid	An alternative to "times interest paid" that bases coverage on payments made rather than expense incurred.
Operating Cash Flows to Current Liabilities	Cash Flows from Operations / Current Liabilities	Measures company's ability to generate operating cash flows adequate to meet obligations coming due in the short term.
Cash GAP	Billing Lag, plus Collection Period, plus Inventory Sales Period, minus Payment Period	Measures how efficient management manages its working capital. High or increasing cash GAP increases client's inherent risk.
Cash to Daily Cash Expenses	Quick Assets x 365 / Annual Cash Expenses	Represents the number of days' expenses that a company's most liquid assets could cover, if no new cash came in.
Operating Cash Flows to Number of Employees	Cash Flows from Operations / Number of Employees	Measures cash flow returns based on full-time equivalent employees.
Operating Cash Flows to Square Feet of Operating or Retail Space	Cash Flows from Operations / Amount of Square Feet	Measure cash flow returns based on usable square feet.

Evaluating Differences from Expected Amounts

While diligently prepared independent estimates inform our audit process, discrepancies between them and recorded amounts are inevitable. However, rather than viewing these discrepancies as hurdles, they become beacons, illuminating areas requiring focused investigation. The true power of substantive analytical procedures lies in their ability to efficiently guide our audit efforts toward these critical points, significantly streamlining the revenue examination process. The degree of investigation will depend on materiality and risk factors, as discussed earlier.

One reason substantive analytical procedures can be so powerful is that, to the extent a balance is consistent with our independent expectation, no further work is necessary. Only the differences from expected amounts require additional consideration. The nature of the work we perform on the differences is very similar to detail tests, because they represent the amounts that were not consistent with the estimates developed using analytical procedures. In other words, we devote more energy to the amounts that look "wrong" and less to those that look "right"—a very efficient and effective approach.

The following discussion questions illustrate this point in the context of substantive analytical procedures for revenue.

QUESTIONS FOR DISCUSSION

Your audit client sponsors an annual trade show. You plan on using substantive analytical procedures to test the revenue from this show by obtaining brochures from the sales department that include floor plans and prices for show booths. By multiplying booths available times rental rates, you obtain an independent revenue estimate of $450,000. The recorded revenue balance is $421,000. The $29,000 difference is significant enough to investigate.

This approach to substantive analytical procedures is sometimes called a "min/max" test, because predictive data is used to calculate a minimum or maximum amount, and then the difference from the recorded amount is detail tested. In this case, a maximum was calculated, i.e., the revenue if every booth was rented. The "beauty" of this approach is that the amount left to audit is $29,000 instead of $421,000.

What are some possible explanations for the $29,000 difference?

How would you "audit" these explanations?

Must you audit every dollar of the difference?

If not, how much must you audit?

SOLUTION TO QUESTIONS FOR DISCUSSION

What are some possible explanations for the $29,000 difference? AND How would you "audit" these explanations?

- **Unrented Booths**: Not all booths may have been rented, leading to lower revenue than the maximum estimate.
  - Audit procedure: Obtain a list of rented booths and compare it to the floor plan to verify occupancy.
- **Discounts or Concessions**: Some exhibitors may have received discounts or concessions, reducing the revenue per booth.
  - Audit procedure: Review contracts or agreements for any such arrangements.
- **Early Bird or Last-Minute Discounts**: Incentives for early registration or last-minute bookings could have lowered the effective rental rates.
  - Audit procedure: Inquire about pricing policies and any discounts offered.
- **In-Kind Sponsorships or Barter Arrangements**: Some booths may have been exchanged for goods or services rather than cash, not reflected in the recorded revenue.
  - Audit procedure: Investigate barter agreements or non-cash transactions related to the show.
- **Timing Differences**: Revenue recognition policies might differ from the analytical estimate.
  - Audit procedure: Review revenue recognition policies and cutoff procedures for year-end.
- **Errors in Brochure Information:** The brochures used for the estimate might contain incorrect floor plans or pricing.
  - Audit procedure: Verify the accuracy of the brochure information with sales or event management.
- **Recording Errors:** Mistakes in recording revenue or deposits could exist.
  - Audit procedure: Trace revenue from contracts and deposits to the recorded amounts.
- **Fraudulent Activity:** Misappropriation of funds or intentional misstatement of revenue is a possibility, albeit less likely.
  - Audit procedure: Assess the client's internal controls and consider performing additional procedures if fraud risk is elevated.

Additional Considerations:

- **Multiple-Day Shows**: Examine revenue for each day separately if booth rentals vary for different days.
- **Non-Standard Booth Sizes**: Account for booths with different sizes or configurations that might have different rental rates.
- **Contractual Obligations**: Review contracts for any revenue-related obligations or contingencies.

It's essential to investigate these possibilities thoroughly to determine the root cause of the difference and ensure the accuracy of the recorded revenue.

Must you audit every dollar of the difference?

- No, it is not necessary to audit every dollar of the difference.

If not, how much must you audit?

- You should be able to explain – i.e., audit – enough of the difference to bring it below the "threshold" established for investigating differences. Careful consideration should be given to whether any unexplained amount should be included in the summary of adjustments passed.

CASE STUDY 4

In performing analytical procedures on sales for your client, you noted the following:

- Sales for December in the current year were significantly higher than recent years, as follows:

	20X1	**20X2**	**20X3**
Annual sales	$7,500,000	$8,000,000	$8,300,000
Dec. sales	$500,000	$520,000	$750,000

- Materiality is $50,000 (tolerable misstatement is .75 × $50,000 = $37,500).
- The client has been unable to explain/isolate the reason for the increase for December sales in 20X3. Review of sales registers for December did not reveal any unusual activity that could be identified and tested.

What would explain the potential audit risks involved?

How much of the $750,000 exceeds your expectation based on the prior two years' information?

If analytical procedures and client explanations cannot solve the mystery of these December sales, what options does the auditor have?

What if the sampled December sales totaling $25,000 are vouched and one $950 January 20X4 sale is found to be erroneously included. How would this be evaluated?

SOLUTION TO CASE STUDY 4

What would explain the potential audit risks involved?

- When a company desires to "improve" reported results, management may inappropriately record fictitious, contingent, or subsequent year sales near year-end. This risk of fraud is in addition to the possibility of unintentional errors causing the increase.

How much of the $750,000 exceeds your expectation based on the prior two years' information?

- December sales in 20X1 = 6.67% of annual sales
- December sales in 20X2 = 6.50% of annual sales
- Therefore, we'd expect December sales in 20X3 to approximate $540,000 – $554,000. So, the "excess" is about $200,000, which is material and should therefore be investigated further. Note: If sales are a significant risk, and they almost always are, analytical procedures alone cannot be applied to a significant risk balance. Test of details or test of controls must also be applied.

If analytical procedures and client explanations cannot solve the mystery of these December sales, what options does the auditor have?

- If analytical procedures cannot adequately explain and test recorded amounts, the only option is to revert to detail tests. In this case, the auditor may choose to sample December sales and vouch to supporting shipping documents and invoices to test the $750,000 for overstatement.
- Sample size could be determined as:
- $750,000 × 3 = 60 selections
  37,500
- Note the following:
- Analytical procedures still saved time, as we had to detail test only one month of sales rather than 12.
- It is more efficient to perform detail tests in this case if trying to "make analytical procedures work" would take more time than vouching 60 sales transactions—or worse, would result in unsubstantiated conclusions.

What if the sampled December sales totaling $25,000 are vouched and one $950 January 20X4 sale is found to be erroneously included. How would this be evaluated?

- The error should be projected only to the population sampled—i.e., December sales—not sales for the year. Sales for January to November were presumably adequately tested via substantive analytical procedures with no problems noted.

Consequently, the projected overstatement would be:

- $750,000 × $950 = $28,500
  $25,000
- Since the amount of projected misstatement is less than tolerable misstatement, it could be treated as a passed adjustment and the sales amount accepted as fairly stated. however, it should be included in the summary of passed adjustments for the audit as a whole.

BENFORD'S LAW

Ever wondered why numbers in the real world aren't evenly distributed? Benford's Law reveals a fascinating pattern in datasets like financial records. It predicts the frequency of digit appearances, with lower digits like 1, 2, and 3 showing up significantly more often than higher digits like 8 and 9.

The story of Benford's Law is as curious as its findings. In the 1920s, while working at General Electric, Benford noticed that logarithm books containing lower numbers were considerably more worn than those with higher numbers. This sparked his investigation, leading him to theorize that smaller digits tend to occur more frequently in naturally arising datasets.

Benford's Law, mathematically formulated as a series of expected digit frequencies, isn't a coincidence. It arises from the way quantities in the real world often span multiple orders of magnitude (imagine comparing a paperclip's weight to a bridge's). This inherent diversity creates a skewed distribution where lower digits, acting as building blocks, naturally appear more often.

This unique fingerprint of numbers makes Benford's Law an invaluable tool for identifying anomalies in financial data. Deviations from the expected digit frequencies can raise red flags, potentially indicating fabricated or manipulated numbers. Forensic accountants and auditors utilize Benford's Law as a powerful weapon in their arsenal, uncovering hidden patterns and exposing financial wrongdoing.

Benford's Law provides valuable insights to secrets hidden within the seemingly mundane world of numbers. It's a fascinating example of how mathematical patterns can offer valuable insights into the real world, helping us decipher the truth buried beneath the surface.

The following table shows the expected digital frequencies and the probability based on the digit:

Digit	1st	2nd	3rd	4th
0	N/A	.11968	.10178	.10018
1	.30103	.11389	.10138	.10014
2	.17609	.10882	.10097	.10010
3	.12494	.10433	.10057	.10006
4	.09691	.10031	.10018	.10002
5	.07918	.09668	.09979	.09998
6	.06695	.09337	.09940	.09994
7	.05799	.09035	.09902	.09990
8	.05115	.08757	.09864	.09986
9	.04576	.08500	.09827	.09982

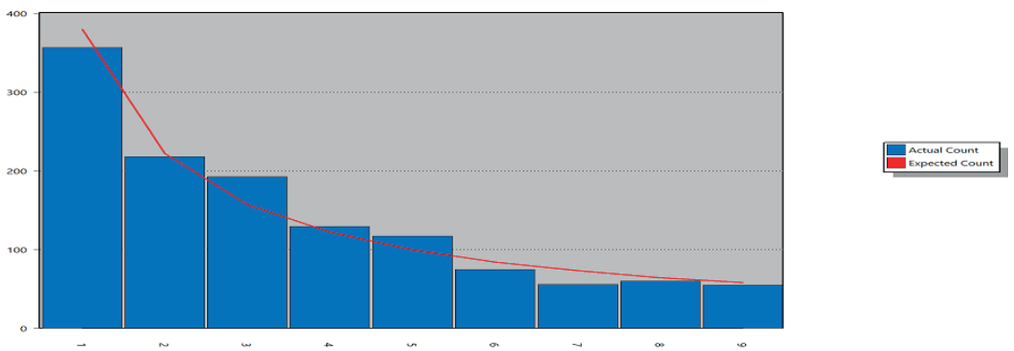
According to the 2022 Association of Certified Fraud Examiners (ACFE*) Fraud Examiners Manual*, one of the goals of a Benford's Law test is to identify fabricated numbers. An important point of note on Benford's Law is the concept of "natural" versus "non-natural" numbers. Natural numbers are those that are not ordered in a particular numbering scheme and are not human-generated or generated from a random numbering system. Non-natural numbers are designed systematically to present information that restricts the natural nature of numbers (for example, employee ID numbers, or zip codes). Testing data sets for the occurrence or non-occurrence of the predictable digit distribution can help identify included numbers that are not legitimate.

In the book, Digital Analysis Using Benford's Law, as noted above, the following criteria must be met for a data set to conform to Benford's Law:

- The data set should describe the sizes of similar phenomena. As an example, the revenues of companies on the NYSE.
- There should be no built-in minimum or maximum values in the data set. As an example, if rent had a minimum floor of $4,000, a data set of rent would have an excess of first-digit 4's. This would create a skew of the data and an expected pattern whereby there would be no transactions with first digit 1, 2, 3.
- The data set should not be made up of assigned numbers. Assigned numbers are numbers given to things in place of words such as social security numbers, bank account numbers, telephone numbers, etc.
- The data set should have more small items than big items.

Additionally, the numbers in data sets should have four or more digits for a good fit for a Benford's Law test; however, it's not required.

Example: Benford's Law graphical display looking at the first digit in a check register (sample data):



Note that:

- Any number in a population that is not "biased" (see 3 below) has more than a 30% chance of starting with a "1," 17.6% chance of starting with a "2," decreasing to only a 4.6% chance of starting with a "9."
- Subsequent digits in amounts have more similar probabilities of occurring. Note that once the fourth digit is reached, the probabilities hardly vary at all.
- Benford's Law is a digital analysis technique, useful at times for fraud detection. It looks at an entire account or a transaction set (cash disbursements) to determine if the numbers fall into the expected distribution. When used on transaction level data, rather than aggregated data, it can assist auditors by identifying specific accounts in which fraud may exist so they can analyze the data more in depth.

Benford's Law works well when data sets result from random variables taken from divergent sources that have been multiplied or divided (the number of items sold multiplied by the price per item). Most accounting related data sets could be expected to conform to a Benford distribution because typical accounts consist of transactions that result from combining numbers.

Problems can occur when applying Benford's Law if the data set is the result of rounding (all the balances end in 000 for example). Problems can also occur if included in the data set are repetitive transactions for identical amounts; population items must occur randomly for a

Benford distribution result. Also, operational inefficiencies or system weaknesses may cause a data set not to comply with Benford's Law.

Other data sets that will not comply with Benford's Law include:

- Assigned numbers (Check numbers)
- ATM withdrawals (Round, predetermined amounts)
- Sales prices ($1.99, $9.99)
- Co-payments for medical procedures
- Minimum materiality values (Capitalize all purchases over $500)

Sampling should not be used to determine if a data set conforms to Benford's Law. If a small number of fraudulent transactions exist in a data set, a significant difference in a distribution will not likely be triggered even if the dollar amount is high.

Finally, frauds will not be discovered using Benford's Law if the fraud results in transactions never being recorded—such as bribes, kickbacks, or asset thefts. In addition, duplicate addresses, shell companies, ghost employees, contract rigging, defective deliveries, or defective shipments cannot be discovered using Benford's Law.

When using Benford's Law, it should be considered as one analytical procedure among others and not as the only analytical procedure.

Using the table:

The probability that an amount would start with the three digits 2-8-0 is:

(.17609) (.08757) (.10178) = .157%

EXAMPLE

You have reason to believe that unauthorized disbursements may be an issue at Ultra Technology, Inc. You therefore select disbursements for a period of time (e.g., one month) and:

- Record the 1st digit only of each check amount in the 1st column of an Excel spreadsheet.
- Have the spreadsheet software (a) sort the numbers, listing all the "1's," then all the "2's," etc., and (b) calculate the frequency with which each occurred.
- Suppose you obtained the following results:

Digit	Frequency	Benford
1	.2157	.30103
2	.1091	.17609
3	.1153	.12494
4	.0895	.09691
5	.0851	.07918
6	.0879	.06695
7	.0750	.05799
8	.1612	.05115
9	.0612	.04576

This distribution suggests too many check amounts starting with digits 6-9 rather than 1-5 (especially 8). The auditor might therefore respond by examining disbursements having dollar amounts starting with the digit 8.

The use of data extraction software can also be used to allow large files to be analyzed this way.

NOTE TO PARTICIPANTS: Refer to the Journal of Accountancy article written by J. Carlton Collins, CPA, April 1, 2017, *Using Excel and Benford's Law to Detect Fraud* (http://www.journalofaccountancy.com/issues/2017/apr/excel-and-benfords-law-to-detect-fraud.html#sthash.exeZqRkN.dpuf).

Benford's law can be seen in popular culture.

In the Netflix "Connected" series, science journalist Latif Nasser investigates the surprising and intricate ways in which we are connected to each other, the world, and the universe. In the episode "Digits," Nasser explores Benford's law and the law of numerical probability that applies to classical music, contemporary social media, tax fraud, and perhaps the entire universe.

The Netflix series "Ozark" used Benford's law to analyze a cartel member's financial statements and uncover fraud.

QUESTIONS FOR DISCUSSION

How might you use Benford's Law to analyze purchases initiated by the purchasing manager authorized to process orders up to $5,000 without outside approval?

How does using Benford's Law "fit" the definition of a substantive analytical procedure?

SOLUTION TO QUESTIONS FOR DISCUSSION

How might you use Benford's Law to analyze purchases initiated by the purchasing manager authorized to process orders up to $5,000 without outside approval?

Some ways you could use Benford's Law to analyze purchases initiated by the purchasing manager authorized to process orders up to $5,000 without outside approval:

Leading Digit Analysis:

- **Compare observed leading digit frequencies to Benford's Law expectations**: Calculate the percentage of purchases starting with each digit (1 to 9) and compare it to the expected percentages predicted by Benford's Law. Significant deviations, particularly an overabundance of "round" numbers starting with 5 or 9, could indicate potential manipulation.
- **Focus on specific ranges**: Within the $5,000 limit, look for specific ranges where manipulation might be more likely, such as just below the approval threshold (e.g., purchases around $4,900). Benford's Law can then be applied to this specific range to detect anomalies.

Second Digit Analysis:

- **Identify specific purchase categories**: Analyze the second digit distribution within certain product categories to see if it deviates from expected patterns. For example, if office supplies typically have purchase amounts starting with 2 or 3, a sudden increase in purchases starting with 7 or 8 could be suspicious.

Combined Analysis:

- **Look for unusual digit combinations**: Analyze the frequency of specific digit combinations (e.g., 37, 62, 88) that might indicate fabricated or rounded numbers.

Caveats and Limitations:

- **False positives**: Deviations from Benford's Law don't automatically denote fraud. Other factors like specific pricing structures or bulk discounts can also influence the digit distribution.
- **Small sample size**: Benford's Law works best with large datasets. Analyzing a small number of purchases might not produce statistically significant results.
- **Need for further investigation**: Even if anomalies are detected, they require further investigation and contextual analysis to confirm any wrongdoing.

Additional Applications:

- **Benchmarking**: Compare the purchasing manager's data to historical data or industry benchmarks to see if there are significant deviations.
- **Trend analysis**: Monitor the leading digit distribution over time to see if any unusual patterns emerge.

By using Benford's Law alongside other analytical techniques and common sense, you can gain valuable insights into the purchasing manager's activity and identify potential areas for further investigation. However, it's crucial to remember that Benford's Law is a tool, not a definitive answer, and any detected anomalies should be treated with caution and investigated thoroughly.

How does using Benford's Law "fit" the definition of a substantive analytical procedure?

- The probabilities comprise the independent data on which we base our expectation of what should be on the books. We compare the actual activity to the expectation and investigate if the variances are high. The only difference is that the actual, expected, and variance amounts are expressed in qualitative (percentage) rather than quantitative (monetary) terms.

CASE STUDY 5

JMT, Inc.

Application of Substantive Analytical Procedures

The audit partner of J&M CPAs has prepared the following client profile memo in preparation for performing a first-year audit of JMT, Inc. Based on the information contained in the client profile, the audit partner has concluded that J&M's audit approach will include conducting substantive tests of details for significant balance sheet accounts, and revenues and expenses will be audited using a combination of substantive procedures, which will include substantive analytical procedures. Internal controls will not be tested.

Client Profile Memo

Introduction

Jane Thompson, the present owner and president of JMT, Inc. ("JMT"), an "S" Corporation, formed JMT in X0. The company was organized to sell women's apparel and related accessories through outlets in large shopping malls. Ms. Thompson's operating philosophy is to sell traditional upscale clothing to professional women who can pay a premium price. Through X3, JMT's business has grown to three outlets located in Southern New Jersey shopping malls.

As a result of increased sales and purchase volume, and the need to secure a significant increase in JMT's working capital loan, Jane Thompson has engaged J&M CPAs to prepare audited financial statements for JMT and assist with the preparation of the company's tax returns. Currently, the only users of the financial statements are Jane Thompson and her brother. The audited financial statements are intended to support JMT's application for an increase in its working capital loan, which is necessary for JMT's expansion.

Jane Thompson's Background

Jane Thompson is a college graduate with a degree in fashion merchandising. Since graduation, she has been employed by various retail businesses as a buyer or marketing representative. JMT is her first attempt at running her own business. Ms. Thompson is a 90% owner of JMT and her brother owns 10%. Her brother partially financed JMT by loaning the company $500,000.

Company Background

JMT established its first store in X0 in Cherry Hill, New Jersey, under the name of Professional Women's Fashions. JMT added one store in each of X2 and X3 in other Southern New Jersey malls. Each store has approximately 1,800 square feet of space used for merchandise display, dressing rooms, storage, and cashier's area.

Mall lease arrangements are for renewable three-year periods and contain penalty clauses for early termination. Lease costs average $20 a square foot per month, with additional charges for allocated maintenance fees.

JMT accepts most credit cards for payment, and approximately 60% of its total sales are made with credit cards.

The company's lines of business are seasonal, requiring close attention to inventory levels and pricing strategies. Due to the nature of JMT's clothing lines, much of its inventory can be stored and offered for sale again in the future.

JMT maintains its administrative office in additional space also leased in the Cherry Hill Mall. Jane Thompson and three full-time employees—an accountant, a buyer, and a secretary—are located in this office. In the future, Ms. Thompson hopes to franchise her store concept throughout the Northeast. Jane Thompson approves all contracts and disbursements and approves hiring all personnel.

Organization

The company employs 16 full-time staff persons and 11 part-time salespeople. Employees are located in the following offices and categorized in the following manner:

Office	Administrative	Manager	Assistant Manager	Full-Time Sales	Part-Time Sales
Central Office	4	-	-	-	-
Cherry Hill	-	1	1	3	5
Deptford	-	1	1	2	4
Burlington	-	1	1	1	2
Office Total:	4	3	3	6	11
Total Employees:	27				

Administrative personnel, managers, and assistant managers are paid a fixed salary plus a performance bonus. Salespeople are paid minimum wage plus a commission of 3% to 5% of each sale made. JMT provides full health benefits, as well as paid vacations, to all full-time employees. Part-time employees are not entitled to benefits.

Products

JMT buys 200 different apparel products which range from dresses, suits, sweaters, jackets, skirts, and blouses, to accessories such as belts, pins, hats, scarves, etc., from four primary designers. All products are marked up at least 100% and some specialty, one-of-a-kind items are marked up at least 200%.

JMT has a limited ten-day return policy for store credit only. Exceptions are rare and must be approved by a store manager. JMT never advertises, but will, occasionally, mark down a discontinued item. Markdowns have been limited to only 4% of unit sales since X1.

Purchasing

Jane Thompson and JMT's buyer, Marcia Wood, do all of JMT's purchasing centrally. The purchasing function is critical to the success of JMT because of the company's professional customer base, premium prices, and product mix.

The annual volume of purchase and disbursement transactions is as follows:

- Purchase orders 600
- Invoices 1,500
- Cash disbursements 1,200

Sales Volume

JMT segregates sales by product, category, and location. Sales records provide the following data:

	X3		X2		X1	
Working apparel	$2,100,000	72%	$1,600,000	69%	$1,100,000	69%
Casual apparel	550,000	19%	500,000	22%	350,000	22%
Accessories	250,000	9%	200,000	9%	150,000	9%
	$2,900,000	100%	$2,300,000	100%	$1,600,000	100%
Cherry Hill	$1,500,000		$1,500,000		$1,600,000	
Deptford	800,000		800,000		–	
Burlington	600,000		–		–	
	$2,900,000		$2,300,000		$1,600,000	

Litigation

JMT is being sued by a primary designer for non-payment of certain items JMT purchased in X2. JMT alleges that these items were of faulty design and, as a result, JMT refused delivery. The designer insists that JMT issued a faulty purchase order, which was the root of the problem, and insists on payment. A trial date has not yet been scheduled, and the dispute is pending decision by an industry arbitrator.

Financial Results

The following summarized financial information has been provided by JMT's accountant, Mary Scott.

	X3	X2	X1
Sales	$2,900,000	$2,300,000	$1,600,000
Cost of Sales	902,000	774,000	503,000
Gross Profit:	1,998,000	1,526,000	1,097,000
Salaries/Benefits	410,000	300,000	200,000
Commissions	42,000	30,000	20,000
Rent	1,325,000	900,000	450,000
Administrative	21,000	14,000	42,000
Interest Expense	50,000	50,000	50,000
Total Operating Expenses:	$1,848,000	1,294,000	762,000
Net Income (Loss):	$150,000	$232,000	$335,000
Operating Cash Flow	$185,000	$240,000	$175,000
Investing Cash Flow	$(175,000)	$(325,000)	$(45,000)
Financing Cash Flow	$15,000	$5,000	$50,000
Assets			
Cash	$90,000	$70,000	$180,000

Accounts Receivable	45,000	30,000	20,000
Inventory	437,000	327,000	195,000
Other Current Assets	25,000	20,000	10,000
Furniture/Fixtures (Net)	130,000	75,000	40,000
Leasehold Improvements	380,000	280,000	200,000
Total Assets:	$1,107,000	$802,000	$ 645,000
Liabilities			
Accounts Payable	$210,000	$100,000	$60,000
Other Accrued Liabilities	20,000	25,000	20,000
Working Capital Loan	175,000	100,000	50,000
Long-Term Debt	500,000	500,000	500,000
Total Liabilities:	$905,000	$725,000	$ 630,000
Capital			
Jane Thompson, Capital	$90,000	$90,000	$90,000
Paul Thompson, Capital	10,000	10,000	10,000
Retained Earnings (Deficit)	102,000	(23,000)	(85,000)
Total Capital:	$202,000	$77,000	$15,000
Total Liabilities and Capital:	$1,107,000	$802,000	$645,000

The preliminary financial statement materiality level has been established at $20,000 based on sales, net income, and operating cash flow.

Required: Based on the information contained in the client profile, develop an audit strategy for applying substantive analytical procedures to revenues and expenses. Identify:

1. Accounts with high, moderate, or low risks.

2. Likely direction of error.

3. Revenue or expense accounts not eligible for substantive analytical procedures only.

The expectations you would develop in connection with the following (including disaggregated data):

- Period-to-period trends.

- Analysis of relationships (reasonableness tests).

- Comparison to industry statistics.

- Use of nonfinancial data.

- Comparison to anticipated results.

- Ratio analysis (including liquidity and cash flow ratios).

SOLUTION TO CASE STUDY 5

JMT, INC.

Required: Based on the information contained in the client profile, develop an audit strategy for applying substantive analytical procedures to revenues and expenses. Identify:

1. **Accounts with high, moderate, or low risks.**
   - **Potential litigation loss** – Risk unknown (insurance coverage?)
   - **Sales** – High risk due to use of financial statements to support loan application.
   - **Cost of sales** – High risk due to use of financial statements to support loan application.
   - **Salaries/benefits** – Moderate risk due to Jane Thompson hiring all employees and approving compensation.
   - **Commissions** – Low risk, limited transactions, Jane Thompson approves all disbursements, third-party evidence easy to obtain.
   - **Rent** – Low risk, limited transactions, Jane Thompson approves all disbursements, third-party evidence easy to obtain.
   - **Administrative** – Low risk, limited transactions, Jane Thompson approves all disbursements, third-party evidence easy to obtain.
   - **Interest** – Low risk, limited transactions, third-party evidence easy to obtain.
2. **Likely direction of error.**

   The primary purpose of obtaining audited financial statements is to use the audited information for expanded borrowings. The criteria for these borrowings will be based on performance improvements and collateral values. Given this information, errors, if any, are likely to be asset and revenue overstatements and liability and expense understatements.
3. **Revenue or expense accounts not eligible for substantive analytical procedures only.**
   - **Sales** – High risk, overstatement potential, need auditor or third-party evidence. Must audit sales prior to using sales as a substantive analytical procedure element.
     1. **Potential litigation loss** – Risk unknown. Must audit 100%. The expectations you would develop in connection with the following (including disaggregated data):
        a. **Period-to-period trends** – Period-to-period account balance trends are ineffective due to the store expansions in X2 and X3. Prior period balances are not predictive of X3 financial statement information and trend analysis cannot be used as a substantive analytical procedure.
        b. **Analysis of relationships (reasonableness tests)** – Relationship expectations related to gross profit, salaries/benefits, commissions, rent, and interest can be developed based on the auditor's knowledge of the industry, local pay scales, knowledge of shopping mall lease rates, lease agreements, and debt confirmation results. (All third-party or auditor generated evidence.)
        c. **Comparison to industry statistics** – Industry statistics are published in Shopping Mall News, Stores, U.S. Census Bureau, and other publications allowing for the development of industry expectations for JMT.

d. **Use of nonfinancial data** – Numerous nonfinancial expectations can be developed for a women's retail store. Examples would include:
   - Sales per **square** feet
   - Sales per **employee**
   - Sales per customer transaction
   - Commissions per employee
   - Commissions per customer transaction
   - Operating **expenses** per store
   - Number of **employees** per store
   - Average **customer** purchase

e. **Comparison to anticipated results** – No budgeted information has been prepared/provided and, therefore, is not available for substantive analytical procedure purposes.

f. **Ratio analysis (including liquidity and cash flow ratios)** – Ratio expectations that could be developed for the purpose of conducting substantive analytical procedures, include the following (Note: Balance sheet ratios are included due to their ability to confirm revenue and expense relationships. Selected balance sheet ratios should always be prepared to support the reasonableness of income statement results.):
   - Accounts Receivable Turnover by Location
   - Number of Days in AR by Location
   - Inventory Turnover by Location, by Designer
   - Number of Days Sales in Inventory by Location, by Designer
   - Accounts Payable Turnover by Location, by Designer
   - Accounts Payable Days Outstanding, by Location, by Designer
   - Gross Profit Ratio by Location, by Designer, by Month
   - Profit Margin by Location, by Designer, by Month
   - Quality of Earnings by Month
   - Operating Expenses to Sales by Account, by Location, by Month
   - Operating Cash Flows to Sales by Location, by Month
   - Operating Cash Flows to Current Liabilities by Location, by Month
   - Cash GAP by Location, by Month
   - Operating Cash Flows to Number of Employees by Location, by Month
   - Operating Cash Flows to Square Feet by Location, by Month

Note: When sales are a significant risk, analytical procedures alone are not sufficient to audit the significant risk assertion or account balance.

Conclusion

The case identifies expectations that could be created by the auditor for applying substantive analytical procedures. Trend relationships and budget comparisons would not be effective. Reasonableness tests, industry comparisons, nonfinancial measurements and ratio analysis should be very effective.

The results of substantive analytical procedures applied must be documented by the auditor, including expectations developed and actual results.

SUMMARY OF STRATEGIES FOR EFFECTIVE ANALYTICAL PROCEDURES

- Beware of two-year comparisons. The prior year may contain anomalies that should be removed before comparing to the current year; trends will not be highlighted as they should.
- Don't calculate ratios you will not use.
- Get the **whole** (not a partial) story when investigating fluctuations from expected amounts or activity and get documentation.
- Don't assume amounts are always consistent over time. Incorporate changes in the client's business operations or industry when developing your expectations for recorded amounts. In the current environment, consistency is usually abnormal.
- Client's explanations for variances must be corroborated with audit evidence when analytical procedures are used as a substantive audit test.
- Scanning accounting records for unusual activity can be a powerful analytical procedures tool.
- Customize analytical procedures for each engagement.
- **Quantify** amounts to investigate and amounts explained. Incorporate materiality and risk.
- **Prior** year unaudited amounts cannot be considered reliable predictive amounts for the current year in **substantive** analytics.
- **Documentation is required for (AU-C 230):**
  - Planning analytical procedures
  - Risk assessment procedures including fraud
  - Follow-up review analytical procedures
  - Substantive analytical procedures

UNIT 2

Data Analytics for Audits and Reviews-Using Technology

LEARNING OBJECTIVES

When you have completed this unit, you will be able to accomplish the following:

- Make the connection between data analytics and its use in audits and reviews.
- Describe what computer aided audit tools can be used to aid in the audit process.
- Use data analytic tools for various accounting applications.

INTRODUCTION

While the concept of data analytics has been around for decades, its application in the accounting world is still in its early stages. Yet, the pace of change is accelerating, propelled by the same forces that have transformed other industries: businesses are drowning in data, and those who can extract insights from it hold the key to success.

This data deluge presents a unique challenge for accountants. For years, our profession has relied on manual processes and static reports. But the sheer volume and velocity of modern data make these methods obsolete. We need to embrace data analytics, not just as a futuristic buzzword, but as a critical tool for survival.

The good news is, we're not alone in this journey. Big tech companies like Google and IBM have paved the way, demonstrating the power of data-driven decision-making. And within the accounting sphere, the Big Four are making significant investments in data analytics capabilities.

But the real question is: Are we, as individual accountants, prepared to adapt? Do we have the skills and mindset to navigate this new landscape? Can we shift from poring over spreadsheets to interpreting complex data patterns?

The answer is a resounding yes. The accounting profession has always been about adapting to change. We are problem solvers, critical thinkers, and masters of detail. These skills are more valuable than ever in the age of data.

This isn't just about staying ahead of the curve; it's about redefining what it means to be an accountant. We can leverage data to unlock new insights, improve efficiency, and ultimately, become trusted advisors to our clients in a data-driven world.

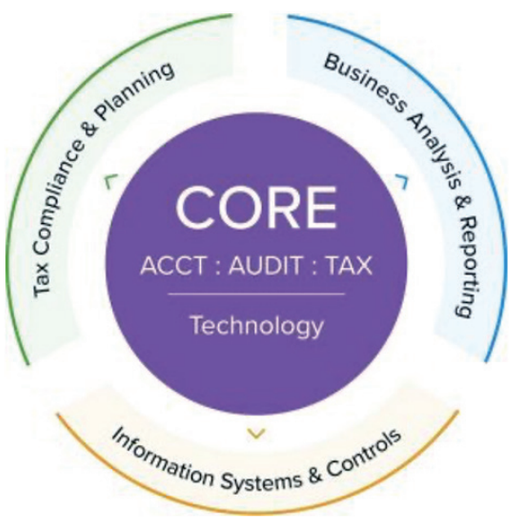
The CPA exam changes effective in 2024 that reflects the technology-driven marketplace of today's accounting world. The new exam considers and incorporates the importance of technology into each of the core sections of accounting, taxation, and audit and attestation, as well as in each discipline section.

This includes:

- A focus on understanding how data is structured and flows through underlying systems.
- Determination of methods to transform data to make it useful for decision making.
- Verifying the completeness and accuracy of source data.
- Using the outputs of automated tools, visualizations, and data analytic techniques to:
- Assist in risk assessment or to complete planned procedures.
- Prepare financial statement, account analysis, tax returns, supporting schedules.
- Identify patterns, trends and correlations to explain an entity's results.2
- So, what does the proposed CPA Exam model look like? The exam is expected to remain in a four-section, 16-hour format. The new CPA licensure model requires CPA candidates to be skilled in accounting, auditing, and tax, and these sections will remain as core, required subjects. Questions about technology will be infused throughout the three core sections.

In addition, candidates will need to have a deeper knowledge in one of the following three primary disciplines:

- Business Analysis and Reporting (BAR) – a continuation of the Accounting core;
- Information Systems and Controls (ISC) – a continuation of the Auditing core, or;
- Tax Compliance and Planning (TCP) – a continuation of the Tax core.



2 AICPA's Exam Blueprints & Model Curriculum

Candidates will be required to pass all three core sections and one discipline on the CPA Exam. Candidates must choose one discipline and are not allowed to sit for another. It is important to note that the discipline passed will not change the type of license granted. The new licensure model results in one CPA license no matter which discipline is chosen.

COMMON TERMINOLOGY

- **Analytical procedures in audits and reviews** – Evaluations of financial information through analysis of plausible relationships among both financial and nonfinancial data. Analytical procedures also encompass such investigation, as is necessary, of identified fluctuations or relationships that are inconsistent with other relevant information or that differ from expected values by a significant amount.
- **Big data** – Extremely large data sets that may be analyzed computationally to reveal patterns, trends, and associations, especially relating to human behavior and interactions.
- **Data** – Facts and statistics collected together for reference or analysis.
- **Data analysis** – Analyzing data directly from data source with the intent to formulate conclusions.
- **Data analytics** – Science (and art) of examining raw data and drawing conclusions on the data.
- **Data extraction** – Obtaining information directly from a data source (no client interaction).
- **Data visualization** – Presentation of data in a visual format. (A picture is worth a thousand words.)
- **Predictive analytics** – Analytics performed in order to give decision makers an understanding of the future consequences of decisions based on known data trends and assumptions.
- **Descriptive analytics** – Analytics aimed at explaining a trend or pattern in data.
- **Business intelligence** – Using technology to transform data into actionable intelligence that informs an organization's strategic business decisions.
- **Structured data** – Any data or information that is located in a fixed field within a defined record or file, usually in databases or spreadsheets.
- **Unstructured data** – Any data that doesn't fit neatly into traditional structured formats or databases.

AICPA RESPONDS TO DATA ANALYTICS

RADAR Project

Rutgers Business School and the AICPA formed the Rutgers AICPA Data Analytics Research Initiative ("RADAR"). The purpose of the project was to further integrate data analytics into the audit process and demonstrate how this can lead to advancements in the public accounting profession. According to press interviews of Miklos Vasarhelyi, Director of Rutgers Accounting Research Center and Continuous Auditing & Reporting Lab, he stated "we have two shared goals. The first is to examine how audit objectives might be achieved more effectively by further integrating data analytics and related technologies into everyday practice. The second is active engagement by firms and universities in fundamental applied research

for continuous improvement in the auditing profession."[3] The initiative was overseen by an advisory board of participating organizations and others. This project will help shape the development of new guidance on audit data analytics and change how audits are approached in the future.

Key learnings and insights from the RADAR Project include the following:

- **Flexibility and Judgment are Paramount**: Identifying and categorizing data for further analysis necessitates sound judgment due to inherent complexities.
- **Filters: Powerful Tools with Caveats**: Determining filter application timing and extent demands careful judgment and understanding of their impact on evidence collection.
- **Filtering Shapes Procedures**: Filters guide the nature, timing, and scope of audit procedures, but their effectiveness hinges on skilled application.
- **Error Assessment Needs Vigilance**: When using filters, auditors must exercise expertise to accurately assess potential errors identified.
- **Data Quality Matters**: Access to relevant and disaggregated data is crucial for developing and applying effective filters.
- **Data Reliability is Key**: Appropriate procedures are essential to ensure the trustworthiness of the data used throughout the audit process.

The RADAR board encourages the audit profession to continue to explore the use of filtering techniques and other data analytics within the financial statement audit. It is not a coincidence that the AICPA Auditing Standards Board issued Statement on Auditing Standards (SAS) No. 142 Audit Evidence in July 2020, that is discussed in more detail in the next section. The new standard includes significant updates around how technology and automation can be leveraged throughout the audit process.[4]

In December 2017, the AICPA released a Guide to Data Analytics, which provided guidance to encourage auditors to make more use of technology-based audit data analytics. Specifically, the AICPA indicated that audit data analytics can enhance traditional audit procedures, contribute to every phase of the audit, and offer a new way of visualizing and analyzing results.

BIG DATA

Big Data is a concept that thrives on the principle that everything we do leaves a data trail. Data comes in a structured format (EXCEL table) and an unstructured format (GPS location of Facebook post). Larger companies can capture and analyze this data to effectuate positive change. Big Data is not just a buzzword or a trend that will go away. In the article, "Big Data: 20 Mind-boggling facts everyone must read," author Bernard Marr indicates some important facts. To name the top 5:

1. The data volumes are exploding; more data has been created in the past two years than in the entire previous history of the human race.
2. Data is growing faster than ever before. In 2020, about 1.7 megabytes of new information was created every second for every human being on the planet.
3. Our accumulated digital universe will grow to around 175 zettabytes by 2025 (a zettabyte is 10 followed by 21 zeros).

3 https://www.aicpa.org/press/pressreleases/2015

4 https://us.aicpa.org/interestareas/frc/assuranceadvisoryservices/radarprojects

4. We perform 40,000 google searches every second.
5. Almost 2 billion people use Facebook daily. So, what is Big Data?

According to IBM, Big Data is being generated by everything around us at all times. Every digital process and social media exchange creates data. Systems, sensors, and mobile devices transmit it. Big Data is arriving from multiple sources at an alarming velocity, volume, and variety. To extract meaningful value from Big Data, optimal processing power, analytics capabilities, and skills will be required.

How Does Big Data Work?

Big Data works on the principle that the more you know about anything or any situation, the more reliably you can gain new insights and make predictions about what will happen in the future. By comparing more data points, relationships will begin to emerge that were previously hidden, and these relationships will enable us to make more informed decisions.

Most commonly this is done through a process that involves building models, based on the data that can be collected, and running simulations, tweaking the value of data points each time and monitoring how this impacts the results. This process is automated; today's advanced analytics technology will run millions of these simulations, tweaking all the possible variables until it finds a pattern—or an insight—that helps solve the problem.

Increasingly, data is coming to us in an unstructured form, meaning it cannot be easily put into structured tables with rows and columns. Much of this data is in the form of pictures and videos—from satellite images to photographs uploaded to Facebook or Twitter—as well as email and instant messenger communications and recorded telephone calls. To make sense of all of this, Big Data projects often use cutting edge analytics involving artificial intelligence and machine learning. By teaching computers to identify what this data represents—through image recognition or natural language processing, for example—patterns can be identified that allow learning faster and more reliably than humans.

Big Data analysis starts the same way all other processes start:

- What are the big picture goals?
- What are the granular goals?
- Where are the weak points?
- What structured data is available?
- What unstructured data is available to us for free?
- What data do we need to combine with our available data to generate a meaningful analysis?

SAS NO. 142 AUDIT EVIDENCE

In July 2020, the AICPA Auditing Standards Board issued SAS No. 142 Audit Evidence, in part to bring the auditing standards dealing with audit evidence into the 21st century (i.e., to recognize the increased application of computer assisted audit tools (CAAT) to analyze "big data"). SAS No. 142 supersedes AU-C section 500, Audit Evidence and amends various other sections of SAS No. 122, Statements on Auditing Standards: Clarification and Recodification, as amended.

Perhaps notable is that SAS No. 142 does not amend AU-C 520 Analytical Procedures. So, if SAS No. 142 does not amend AU-C 520, why talk about it in a program about analytical procedures? The answer is that AU-C 500 provides the overall guidance about audit evidence.

SAS No. 142.05 (which became AU-C 500.05) states:

> The objective of the auditor is to evaluate information to be used as audit evidence, including the results of audit procedures, to inform the auditor's overall conclusion about whether sufficient appropriate audit evidence has been obtained.

As analytical procedures are audit procedures, they are covered by the concepts discussed in SAS No. 142, but care must be taken to distinguish an analytical procedure from using CAAT to analyze Big Data. In other words, analytical procedures and data analytics may sound alike, but they are two different things. In the author's view, analytical procedures are a subset of data analytics.

As we discuss below, data analytics are performed utilizing CAAT on an entire population of activity. With many, if not all, of the products discussed below, it is certainly possible to include specific analytical procedures in the data analysis.

The key points to keep in mind when applying the SAS No. 142 concepts when evaluating analytical procedures as audit evidence are:

- The relevance and reliability of the information used in the procedure, including its source
  - Is the analytical procedure sufficiently precise and detailed to be fit for purpose?
- Whether the results of the procedure corroborate or contradict assertions in the financial statements

TECHNOLOGIES THAT AID IN THE AUDIT PROCESS [COMPUTER AIDED AUDIT TOOLS (CAAT)]

When selecting a tool to utilize to perform data analytics, it is important to consider the users of the tools, the frequency of expected use, and the training time that is available and afforded to those users. From experience, more time spent working with the tools more frequently develops a level of proficiency.

One of the most common challenges is in accessing relevant data. Once data is accessed, then determining what is important from what is not important is critical. Data is meaningless until meaning or value to that data is provided. At times, siphoning through mountains of data can be time consuming and often highly inefficient. To complicate matters, auditors may be limited to the data that is available as part of the audit process. In order to address these issues, specialized software exists that can aid in the audit process (computer aided audit tools or CAAT tools).

Tools commonly used in the audit or accounting function are described as follows.

Microsoft Excel

Microsoft Excel is the most commonly used tool in the profession and is used to capture everything from a reconciliation of prepaid expenses to capturing thousands of rows of data generated for analysis purposes. Excel has strong computing capability and oftentimes is the most comfortable, user-friendly tool to use. Microsoft Excel is the "ole standby" in the

industry; however, it is not fail-proof. Untrained users can make material errors, as there are no true "checks" to the analysis performed other than sum formulas.

Basic tasks such as filtering, sorting, creating pivot tables, and writing "IF" formulas are possible with EXCEL. The platform works well; however, it does not have the same processing engine as an IDEA or Galvanize (ACL) technology for large data sets.

IDEA[5]

IDEA is an advanced data analytics tool built for internal/external auditors that provides full functionality from importing complex files to performing extraction and interrogation of data. The program can read flat or relational databases, spreadsheets, print files, and many more file types. Commands are both pre-programmed (click of a button), as well as customizable with the scripting feature.

IDEA also has several add-ins, including "smart-analyzer" and a data visualization add-in. The smart analyzer allows the user to have several pre-built scripts/functions to run common fraud and other audit related tests such as a journal entry test or an interrogation of accounts receivable subsidiary ledger. The data visualization tool allows the data to be mapped pictorially to provide an added level of analysis and documentation for the audit file.

Galvanize (ACL)[6]

Galvanize is an advanced data analytics tool built for internal/external auditors that provides full functionality from importing complex files to performing extraction and interrogation of data. Galvanize was built on a computer programming light platform that provides for functions to be developed and written to standardize and streamline processes and functions to create efficiency and effectiveness. Galvanize has significant advantages when automating tasks using the scripting function. Additionally, Galvanize can handle large data sets and has strong processing power.

Like IDEA, the program can read flat or relational databases, spreadsheets, print files, and many more file types. Commands are both pre-programmed (click of a button), as well as customizable with the scripting feature.

TeamMate Analytics[7]

TeamMate Analytics is based in Microsoft EXCEL as an add-in. TeamMate Analytics was conceived and has been designed to be a tool for every auditor in your team regardless of their IT skill level. Everything is designed to help the auditor run the analytics needed. It is designed specifically for auditors—this is not a generic analytics tool; TeamMate uses familiar auditor-friendly terminology and is built to be a point and click operation. Every input is validated with simple red/orange/green color coding to guide the user through the process.

5 https://www.casewareanalytics.com/products/idea-data-analysis

6 https://www.wegalvanize.com/

7 http://www.teammatesolutions.com/data-analytics.aspx

MindBridge AI[8]

MindBridge AI is a sophisticated fraud investigation tool designed to perform multidimensional analysis on a transaction ledger. This tool was designed to ingest, understand, and perform advanced queries on data. Unlike IDEA or Galvanize (ACL), which operate on a command basis, the MindBridge tool performs a multidimensional analysis on each transaction and assigns a transaction "risk" score to those transactions. This risk score is then aggregated and compared to all other transactions. The transactions with the highest score are deemed to be of high risk.

Based on experience working with these platforms, a summary of these platforms and their core functionalities is as follows:

Function	IDEA	Galvanize (ACL)	TeamMate Analytics	MindBridge AI
Importing all file types	Yes	Yes	Yes	Excel only or direct system connection
Journal entry testing	Yes	Yes	Yes	Yes
Sampling	Yes	Yes	Yes	No
Stratification	Yes	Yes	Yes	No
Risk score assignment and multidimensional analysis to transactions	No	No	Yes	Yes
Data Joins, appends, and aggregations	Yes	Yes	Yes	No
Scripting	Yes	Yes	No	No
Data visualization	Yes	No	Yes	Yes
Can handle large data sets	Yes	Yes	Limited to Excel size and processing speed	Yes
Benford's Law	Yes	Yes	Yes	No
Pivot tables	Yes	Yes	Yes	No

8 http://www.mindbridge.ai/

Validis[9]

Validis has developed technology that connects directly with accounting packages and extracts core data such as the general ledger, accounts receivable subsidiary ledger, and accounts payable subsidiary ledger. This tool allows auditors to receive a standard set of data with pre-written reports that can be utilized in the audit process. The tool is designed to alleviate the pain of tracking down data and putting it into an easy-to-use format (cloud view or Excel).

Validis is currently compatible with the following accounting packages in the U.S.:

- QuickBooks
- QuickBooks Online
- Xero
- Sage 50 (Peachtree)
- Sage ACCPAC
- Microsoft Dynamics GP
- Microsoft Dynamics NAV

This technology is an advancement in the way to approach an audit. Historically, an auditor could spend a significant amount of time working with data to normalize it and put it into a format that was usable. This tool takes that normalization and time away by generating that data for the auditor. The tool is secure and requires authorization of the client to release the data.

PDF Conversion Tools

One of the most common challenges faced in the accounting profession is obtaining usable data. This is especially true when it comes to print or PDF type files. Tools such as IDEA, Galvanize (ACL), and TeamMate Analytics come with converters/conversion wizards that guide one through the process. However, without access to these tools, other tools exist that can help with software conversion. Without access to the advanced tools, consider using the Adobe built-in tool.

- Adobe 10 – Click on File>Export to>Spreadsheet>Microsoft Excel workbook
- Adobe pre-10 – File>save as>label as an Excel spreadsheet as the file type to save as

The data will export to an Excel spreadsheet. Warning: Occasionally, there will be required cleanup based on the data exported and the complexity of that data.

Microsoft Power BI

Power BI is a suite of business analytics tools that deliver insights throughout an organization. Power BI is used to connect to hundreds of data sources, simplify data prep, and drive ad hoc analysis. The tool is used to produce reports and then publish them for an organization to consume on the web and across mobile devices. You can create personalized dashboards with a unique, 360-degree view of a business.[10] Microsoft Power BI is utilized to gather data and visualize it in such a way that the data can be useful.

9 https://validis.com/

10 https://powerbi.microsoft.com/en-us/

Alteryx

Alteryx, one of the leaders in analytics automation empowers analysts and data scientists with a self-service data analytic experience to unlock answers from nearly any data source available with 250+ code-free and code-friendly tools. Using a repeatable drag-and-drop workflow, one can quickly profile, prepare, and blend all of data without having to write SQL code or custom scripts. This used to require leveraging multiple tools—and even multiple people—to create an analytic model or report.[11]

The Ernst & Young (EY) organization announced in November 2022 an alliance between Alteryx and Ernst & Young LLP (EY US), to help organizations unlock the power of data through automation and digital transformation.

As organizations undergo digital transformation efforts, they tend to devote more time to data manipulation than to data analysis. The Alteryx platform combines three key pillars of automation and digital transformation—data, processes, and people. Users are then better able to unlock the value of advanced analytics using its user-friendly platform, analyze a wide range of data from multiple sources, and deliver business insights to answer business questions more efficiently.[12]

SPSS (IBM)

IBM® SPSS® Statistics is a powerful statistical software platform. It offers a user-friendly interface and a robust set of features that lets an organization quickly extract actionable insights from data. Advanced statistical procedures help ensure high accuracy and quality decision making. All facets of the analytics lifecycle are included, from data preparation and management to analysis and reporting.[13]

DATA ANALYTIC TECHNIQUES

Data analytical procedures can be utilized on a variety of accounting/attest related engagements, including but not limited to audits and reviews.

Acquiring Data

Before any function can begin, data must be obtained. The majority of projects and initiatives do not fail because data does not exist. Typically, it is either data cannot be accessed or data is maintained in silos and is not tapped and combined to produce meaningful information. Data can be a very powerful tool if captured appropriately.

The reporting that is required to execute any function using technology operates on a simple principle: garbage in, garbage out (GIGO). The most powerful tools can be offered and provided to all staff. However, if data cannot be successfully acquired or validated, those tools are useless and meaningless. Additionally, if the data acquired is poorly kept and maintained, then the tools also will serve minimal utility except to confirm that the data cannot be relied upon (which is not the point!!).

11 https://www.alteryx.com/about-us

12 https://www.prnewswire.com/news-releases/ey-announces-alliance-with-alteryx-to-help-accelerate-digital-transformation-through-analytics-automation-301684570.html

13 https://www.ibm.com/products/spss-statistics

Client data entry is extremely significant. Advising the client on data entry is an important first step to receiving data that you can work with.

If a manual report has to be prepared using data from multiple sources, generally that would indicate that data is not being captured in a usable manner. Data cannot always be captured to remove manual tasks; however, many times there are solutions. Understanding what data is being captured and what data is not captured (but could be) is usually identified in walkthroughs or other testing. Time savings for the auditor and the client could be realized by (also, having data available to perform better analysis) having data entered appropriately that creates more usable information!

In an assurance engagement environment, data comes from various sources. Each engagement carries different challenges, different systems, and different sets of data from a multitude of software packages.

When making a request for data:

- Understand the capabilities of the software platform being used.
- Determine the main transaction register (general ledger).
- Identify the associated subsidiary ledgers or journals.
  - The subsidiary ledgers may be integrated (direct feed to the general ledger) or
  - Not integrated.
- Identify how the systems interface.

When a subsidiary ledger is directly integrated, there are fewer concerns about data not being reconciled or not being complete. However, when a subsidiary ledger is not integrated with the main transaction register, there are many other considerations including but not limited to:

- How do the systems communicate with each other?
- Do the systems integrate using a manual process or automated process?
- Are IT general controls in place to capture all the data?
- Does the organization have appropriate controls in place to reconcile the data between the systems?
- Are the systems managed by the same people or different people?
- Are both systems following the same rules (for example, is one cash basis and one accrual basis)?

In practice, it is not unusual to find that the revenue or billing ledger is not integrated with the general ledger. This is especially true in not-for-profit organizations where the donor's contributions subsidiary ledger is not reconciled to the income from contributions in the general ledger (which creates its own set of challenges).

EXAMPLE

NOT-FOR-PROFIT ORGANIZATION

Many not-for-profit organizations utilize QuickBooks for their main general ledger accounting package. The development (fundraising) department utilizes a separate contribution tracking/CRM system to capture donations. Through inquiry and walkthrough procedures, we identify that the development department and the accounting department do not talk to each other. We also noticed that the development department is the first one to receive the checks, update their contribution tracking/

CRM system, and then the information is provided to the accounting department (only with checks). What controls need to be in place to prevent an error?

- Daily cash receipt totals should be matched between the two systems.
- Reconciliations should be prepared to identify differences between the basis of accounting utilized.
- Accounting and Development should have a periodic meeting to understand the data being captured (cash basis vs. accrual basis).
- Accounting should speak with the software providers to identify a way to integrate the data such that there are not manual postings (duplicate effort).

Data File Type or Format

Data can be exported from systems in a multitude of formats. Some of these formats are readable by a human (machine printed, PDF, text, EXCEL) and some are only readable through computer software (Delimited Text, database files, etc.). Files may be readable; however, the use may be limited if the files cannot be searched or the data cannot be extracted into a structured format.

Therefore, to utilize technology, one must determine which of the formats is compatible with your technology tool (IDEA, Galvanize [ACL], etc.). If you spend 50% of your data analysis time on importing the data and 50% on carrying out the analytics tasks, the efficiency may not outweigh the time cost of using certain software. Therefore, it is important to fully understand the data and acquire the data in the format that will take the least amount of time to begin working with. If the client has an EXCEL file and it is very messy (not structured in a table) or a PDF file, the question one should ask is "which takes less time to convert into a table?"

For a continuous task, such as an annual, monthly, or weekly, scripting the process may be worth the investment. Certain technologies, such as IDEA or Galvanize (ACL), allow the user to write commands that can be executed again such that a consistent file format and file is provided (regardless of the data on that file). Therefore, running a task the first period may be time consuming and costly; however, running the task for a second period can result in significant time savings if data can be scripted. This is common when utilizing Galvanize (ACL) software to script the import function and save those scripted functions. The import process is arduous the first time around; however, upon creation of a script, the benefits are significant.

In a typical audit engagement, the following files are obtained from a client's master accounting package and subsidiary ledgers:

- Trial balance at year-end
- General ledger ("GL") for period under audit
  - Account number
  - Account description
  - Sub account number
  - Sub account description
  - Batch #
  - AJE# if different than batch
  - Journal source code
  - Transaction date
  - Period posted (if different than transaction date)

Some understanding of programming concepts is required to properly utilize CAAT. This is a list of possible data fields that may be utilized to perform data analysis.

  - User posted by
  - Time posted
  - Description of transaction
  - Debit amount
  - Credit amount
- General ledger for subsequent period (same information as above GL)
- General journal entry posting file
- Cash disbursement (or check) register for period under audit
- Cash disbursement (or check) register for subsequent period
- Cash receipt journal for period under audit by customer by invoice
- Cash receipt journal for subsequent period
- Analytical procedures aging schedule at year-end by vendor by invoice
- AR aging schedule at year-end by customer by invoice

There are tools available (some have been around for decades) and more are being developed that can create a direct bridge into an accounting package and extract the reports in readable format effectively and efficiently.

Many times, the client contact person does not know all of the capabilities of systems. The software vendor can usually provide guidance as to relevant information and files that can be produced and made accessible.

The general ledger often contains substantial data in either a pre-built report or one customized to run specific fields of information. Depending on the size of the general ledger, this can create a daunting and extraneous burden on the network when running these reports; therefore, when requesting reports, be flexible and request them in advance. Communication with clear expectation and timeframes produce better results in obtaining usable data.

The benefit of the data analytics software is that the user is provided with a closer view at the data in a different way. Galvanize (ACL) and IDEA both have stratification functions whereby a stratum can be set to allow for a disaggregation of the population by number of transaction as well as by amounts. By running/re-running using different strata inputs, data patterns may be identified that normally would not be seen using a manual non-CAAT approach.

Journal Entry Testing

Large-scale transaction analysis demands robust tools. This is where journal entry testing, powered by data analytics software, comes into play. It empowers auditors to dissect vast datasets, extracting and isolating specific transactions based on targeted criteria. This focused approach becomes increasingly critical as data volumes swell, enabling auditors to hone in on potential risks, specific accounts, or other areas of concern.

For smaller datasets, manual analysis might remain the most efficient option. However, as data complexity and volume escalate, journal entry testing unlocks powerful investigative capabilities. The key lies in clearly defining the objectives of the test. Instead of simply selecting software and performing generic searches, auditors must articulate their specific goals. Instead of saying “I want to test journal entries in Galvanize (ACL),” a more effective approach is to ask “I want to utilize Galvanize (ACL) to identify all journal entries exceeding

a predefined threshold, those posted by specific users, or those falling outside normal closing periods." By focusing the inputs, the outputs become more targeted and valuable.

Popular software like IDEA, Galvanize (ACL), TeamMate Analytics, and even Excel offer powerful capabilities for journal entry testing. These tools serve a critical role in mitigating fraud and management override risks by pinpointing specific transactions for further scrutiny and documenting the auditor's evaluation of significant entries.

Fundamentally, journal entry testing equips auditors with a sophisticated lens for examining financial data. It allows them to target specific areas of concern, gain deeper insights into individual transactions, and ultimately improve the overall audit process.

The most common of queries or "tests" performed in the journal entry test using technology are as follows:

Test	Transactions That Might Be of Interest
999 amounts	■ A search that identifies all transactions whereby the last 3 digits before the decimal place are 999. ■ Utilized to detect entries that are just below tolerable approval limits and transactions below certain dollar thresholds.
Large amounts	■ Extraction of all transactions or individual transaction postings > a defined input. ■ Valuable test to identify significant transactions and entries and uncover non-standard entries, which typically carry larger dollar values.
Out of balance entries	■ Utilized to identify and isolate journal entries that do not balance across journals or among the entry ID.
Rounded amounts	■ Utilized to identify transactions ending in a round even number ('000). ■ Significant items such as purchase agreements, large transfers, and other non-standard transactions are typically identified.
Specific dates	■ Search for transactions posted on typical days off such as Federal or company holidays.
Weekends	■ Search for transactions posted on weekend dates. ■ This is useful for organizations whereby the employees do not work on weekends. Transactions posted on non-working days may be indicative of fraud.
Keyword search	■ Extraction of all transactions posted with an identified word included within the description or memo field. ■ Typical searches are for words indicative of manual override such as: "error," "quota," "reclass," "override," "mistake," "correction," "estimate."
Unusual times	■ Extraction of the transactions posted at time periods defined by the user. ■ Typically, this would include a search for times outside of normal working hours.
Unusual postings	■ Focused search to identify transactions to accounts that are out of place. ■ Common examples include transactions that are debits to liabilities and credits to income, transactions posted to revenue whereby the other side of the transaction is other than receivables or deferred income, and re-classifications among profit and loss accounts to distort classification (manual adjustments to EBITDA accounts; inflating revenue/expenses to increase top line, etc.).

Join or Match Functions—Data Comes from Multiple Files

Joining databases is an important function when working across technology platforms. The join function works when there is a common field among two databases and layers an additional column or columns onto a database. The two databases are matched by using a

common field. That common field will need to be a character (text) and should be unique to a particular item. This field used for the join can be called the "primary key" or "unique key."

There are several types of joins that can be performed; however, the most common are as follows:

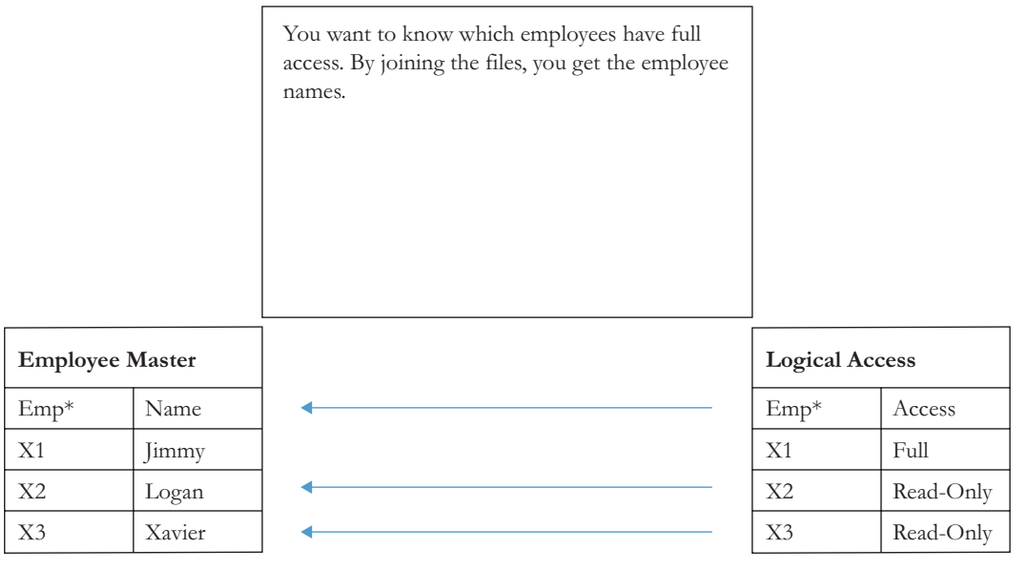
One-to-One

A one-to-one join creates a direct link between two unique entries in separate databases, assuming each entry only exists once in its respective database. It's like pairing up items on two lists where each item has a distinct match on the other list.

This type of join doesn't work for databases with potential duplicates, like combining two transaction-level databases (e.g., a general ledger and a sales journal) where individual transactions might appear in both.

An example of a one-to-one join would be matching an employee master file by employee number to a logical access database, where each employee has a unique number and a unique set of assigned access permissions.

Example of one-to-one join:



Employee Master	
Emp*	Name
X1	Jimmy
X2	Logan
X3	Xavier

Logical Access	
Emp*	Access
X1	Full
X2	Read-Only
X3	Read-Only

Many-to-One

A many-to-one join is a way to link multiple entries from one database to single, corresponding entries in another database. It's like matching up details from a list of transactions to their corresponding master records.

This type of join is often used in auditing to connect specific transaction data (like individual sales or payments) to broader information about customers, accounts, or products stored in a master file. It helps you see the bigger picture and analyze patterns within the transactions.

For example, you could use a many-to-one join to match sales transactions to customer records, allowing you to see each customer's purchase history, total spending, and other relevant details.

EXAMPLE

You are auditing a not-for-profit organization that receives federal funding and are performing testing procedures over allowable cost. The general ledger has expense categories and cost centers with a logical coding structure as follows:

- 50000 – payroll and benefits
- 52000 – consulting and professional fees
- 53000 – occupancy
- 54000 – other direct expenses
- 55000 – indirect costs

In this example, there are multiple payroll accounts, including 50001, 50002, 50003, 50004, etc. You would like to perform your sampling based on budget category, whereby the budget has 5 main categories: 1) payroll and benefits, 2) consultants and professional fees, 3) occupancy, 4) other direct costs, 5) indirect costs. A many-to-one join can be performed from the transaction register to the budget categories to create a new field (column) within the database to include these categories. A stratified sample can then be performed, which then utilizes the budget category as the strata.

Example of many-to-one join:

Account	Date	Name	Amount
50001	1/1/2017	Sam Smith	1.00
50001	1/1/2017	Pete Smith	38.00
50002	1/1/2017	Sam Smith	75.00
50002	1/1/2017	Pete Smith	112.00
52000	1/1/2017	Plumbers LLC	334.00
52001	1/1/2017	Electrician LLC	371.00
52001	1/1/2017	Tony's Pizza	408.00
52001	1/1/2017	Vinny's Pizza	445.00
53001	1/1/2017	Bounce Castle	741.00
53001	1/1/2017	Bounce Castle	741.00
53001	1/1/2017	Bounce Castle	741.00
54001	1/1/2017	Tony's Pizza	408.00
54001	1/1/2017	Vinny's Pizza	445.00
55002	1/1/2017	Tony's Pizza	408.00
55002	1/1/2017	Vinny's Pizza	445.00

Profix	Category
50	Payroll and benefits
52	Consulting and professional fees
53	Occupancy
54	Other direct expenses

Create a new file summarized by the first 2 digits, which represent the different categories.

Many-to-Many

When you want to find unexpected matches between two databases that have multiple entries for the same key, a many-to-many join can be helpful. It links all possible combinations of matching entries, even if they're not the most common pairings.

For example, you could use a many-to-many join to compare employee addresses to vendor addresses to see if any employees live at the same addresses as vendors. This could potentially flag conflicts of interest.

However, many-to-many joins can create complex results that are hard to sort through. To make analysis easier, it's sometimes better to summarize the data from each database before joining them. This can create simpler, one-to-one matches that are easier to understand.

Example of many-to-many join:

CHECK_NUMBER	VENDOR_ID	DATE	PAYMENT
11817	John Smith	1/3/2017	22020.00
11818	John Smith	1/7/2017	311.28
11819	John Smith	1/7/2017	61.20
11820	John Smith	1/7/2017	201.66
11821	John Smith	1/7/2017	854.51
11822	John Smith	1/7/2017	114.70
11823	John Smith	1/7/2017	124.56
11824	John Smith	1/7/2017	641.27
11825	John Smith	1/7/2017	306.54
11826	John Smith	1/7/2017	476.80
11827	John Smith	1/7/2017	801.21
11828	Harry Jones	1/7/2017	346.84
11829	Harry Jones	1/7/2017	331.94
11830	Harry Jones	1/7/2017	158.45
11831	Executive Director	1/7/2017	91.80
11832	Executive Director	1/7/2017	345.20
11833	Executive Director	1/7/2017	87.00
11834	Executive Director	1/7/2017	800.99

Name	Address
John Smith	123 Easy Street
John Smith	1234 East Street
Harry Jones	13 Snowman Way
Harry Jones	14 Snowman Way
Harry Jones	13 Snowman Way
Executive Director	35 pkwy 18
Executive Director	35 pkwy 18
Executive Director	96 Tpk dr

Example Joins in Practice

Example 1—Relevant Assertion Risk is Existence

When performing an ERISA audit of a defined benefit plan, eligibility is critical. For the compliance test, determining if all employees that were either added to the participant valuation report or subtracted from the participant report were eligible is required. A very simple procedure that can be performed is combining the prior year participant valuation report with the current year participant valuation report to identify matches (people that were in the plan last year and in the plan this year) versus non-matches (which can be people in prior year not in current year OR people in current year not in prior year). This allows the auditor to very easily test existence of the data because we can hone our sample population and ignore the matches.

Example 2—Relevant Assertion Risk is Completeness

The matching procedures would more likely be from different databases than in the example above. One procedure would be to take the participant valuation report and perform a join with the payroll register. The payroll register commonly has important details such as "date hired" and "date terminated." This will allow the auditor to identify employees that became newly eligible or identify employees that were terminated to identify if they were marked consistently across platforms.

Common Joins in Practice

- Comparison of employee master file to vendor master file for address matches
  - Matching key: address
- Comparison of participant valuation report contributions to payroll file contributions
  - Matching key: employee ID
- Identification of related party transactions by combining one of the following: the cash disbursement journal, the sales journal, expense ledger, general ledger with a listing of known related parties
  - Matching key: name
- Matching summarized bank data by date with summarized cash transactions in the general ledger by date
  - Matching key: date

Append Function

In certain cases, files are exported into multiple sheets in one workbook (i.e., a general ledger exports to six different tabs in one EXCEL file). The append function will come in handy if this occurs and allows for multiple files to be merged together in order to create one master database. In practice, this is seen on files with weekly data on a different tab. The goal is to collate this data into one (1) database, not several workbooks with discrete data.

Consider the following:

The client provides a payment register by week on a separate EXCEL tab due to the size of data. Appending the database allows you to take all those tabs and create 1 continuous database to be able to perform better data analytics and other procedures.

APPLICATION FOR SPECIFIC ACCOUNTS

Accounts Payable

- Common file requests: Accounts payable detail file at year-end; check register; general ledger; vendor master file.
- With accounts payable, technology can be utilized to focus on the following items:
  - **Fictitious vendors or conflict of interest** – Summarization or aggregation of data over a multiple-year period could identify this. Specifically, if summarized by a vendor, one can now identify when a vendor came aboard via their first invoice, which could then result in isolating testing to new vendors.
  - **Fictitious, inflated, and/or duplicate invoices** – Performing a duplicate test of vendor and amount could identify an issue. Look specifically at the count over a period of time (For example, assume you look at year 1, year 2, and year 3. Year 1 there are 12 invoices, year 2 there are 12 invoices, and year 3 there are 15 invoices.) By identifying that year 3 has an anomalous number of invoices, it can quickly identify a need to investigate year 3 as there may be duplicates (not by number but by service) or errors (invoice entered twice).
  - **Write off payables** – Summarization of activity by vendor in accounts payable by type (invoice, journal entry, cash payment, currency adjustment) would identify whether there are any adjustments to invoices that require investigation. A client may

decide to write off an old liability, which would be identified through this simple analytic.

- **Compare accounts payable aging data** – Take an accounts payable aging schedule for year 1, year 2, and year 3. Combine those schedules by vendor and identify issues such as non-payment of vendor bills (could be fictitious transactions), inconsistency or issues of missing payables, and patterns that can be used to explain overall fluctuations.
- **Subsequent payments** – Combine the listing of subsequent payments of the accounts payable to the listing of accounts payable at year-end. This will identify what was paid and what was not. Sometimes non-payment could imply a contingency or estimate in accounts payable requiring further procedures to address.

- In contrast, manual audit procedures for accounts payable include the following:
  - **Obtain check register, selected XX transactions haphazardly**
  - **Eyeball accounts payable this year vs. accounts payable last year**
  - **Make haphazard selections from accounts payable aging schedule**

Accounts Receivable

With accounts receivable, technology can be utilized to focus on various items.

Common file requests include accounts receivable detail file, cash receipt journal, sales journal, general ledger, customer master file.

The following can be done:

- Join the sales journal and accounts receivable journal by customer to identify any significant concentrations of accounts receivable to sales to identify instances of accounts receivable collectability. Are there any clients where there are 100% AR compared to sales that may warrant confirmation or further testing?
- Roll forward – summarization of activity by customer in accounts receivable by type (invoice, journal entry, cash payment, currency adjustment) would identify whether there are any adjustments to invoices that require investigation. A client may decide to write off an invoice to an account other than bad debts to hide it, which would be identified through this simple analytic.
- Join the accounts receivable journal at year-end to a subsequent payment listing to match payments to the specific invoices to which they relate. This will identify which invoices were collected after year-end to better focus the accounts receivable confirmation testing.
- Sampling – stratify the accounts receivable invoice population for confirmation testing.
- Age the accounts receivable listing by invoice date to verify that the aging schedule provided was not manipulated.
- Combine 3 years of aging history to identify instances of slow-moving customers or payments and to help perform a retrospective review of the allowance for doubtful accounts.
- In contrast, manual audit procedures for accounts receivable include the following:
  - Obtain accounts receivable aging detail, foot, crossfoot
  - Make xx haphazard selections
  - Select cash receipts after year-end and manually tie back to the accounts receivable aging to see what was collected

Payroll

Significant data typically exists around payroll.

Common file requests: Payroll processor report by pay period; timekeeping data; employee master file, general ledger.

This data can be used for many purposes including but not limited to:

- **Importing** – Script the import of payroll processor master file data.
- **Duplicate or unauthorized payments** – Identify instances where employees are getting paid twice for the same service. Obtain payroll processor data and summarize by employee for the year and compare to payroll authorizations. The payroll authorizations can be joined against the summarized data and compared to identify instances where employees are being paid more than authorized amounts.
- **Individuals set up as vendors and W-2 employees** – Join the payroll master file address list with the vendor master file address list and identify any instances with a duplicate address. The same can be done with the listing of employee names and vendor names to identify matches. Performing a match can help alleviate common issues of names being close but not the same (Bill Johnson vs. William Johnson vs. Billy Johnson).
- **Unapproved overtime hours** – Summarize the hours by week by employee and create a database for comparison (such as approved hours by person by week). In certain cases, companies may have manual sheets of approved time or may indicate that no overtime is allowed—each case would be analyzed and understood to determine the appropriate course of action. By looking at # of hours worked by pay period, one can easily identify whether payroll hours are being logged in excess of approved amounts.

Unauthorized salary increases – assume a client has a policy whereby salary increases are granted annually. Obtain the payroll processor data, summarize by pay period and perform an extraction whereby each employee has more than XX number of changes in their compensation.

- In contrast, manual audit procedures for payroll include the following:
  - Reconciliation of payroll from 941 report to general ledger
  - Sampling timesheet system or payroll general ledger
  - Year-over-year analytic of payroll data

Travel and Entertainment Expense Reimbursements

Travel and entertainment expenses are an often-abused area and an area of high risk for large organizations with many employees. There often are multiple systems involved and many individuals with approval authority.

Common file requests: General ledger; credit card detail reports; travel and entertainment tracking system data; check register.

The following can be done:

- **Split purchases** – Run an analytic function to summarize transactions (same employee, expense type, date, and amount). Perform a duplicate test; then test to determine if those items extracted are below an authorized limit, which may be indicative of sliding expenses through under an approval limit.

- **Duplicate submissions for the same bill** – This can occur when an employee submits an invoice for approval and then also includes that within their expense report. This may involve combining multiple reports depending on how the company tracks these types of expenses. For example, travel reimbursements may go through an expense system such as Tallie or Concur. But invoices for vendor payments may go through the general ledger Accounts Payable module directly without being entered into Tallie or Concur. Or even more difficult, a corporate card may be used for purchases OR an employee submits through a central processing arm and the information runs through a secondary system. All of these possibilities create an environment where duplicate submissions can occur. This can be done by performing an extraction of all payments out of accounts payable to employees and summarizing by employee by invoice. Then, perform the same extraction and summarization out of the expense reimbursement system (or credit card transaction report, whichever is used by client). Compare the data to identify duplicates.
- **Abuse of spending** – This occurs when the company does not have a handle over their expense reimbursements and does a poor job of tracking travel and expense account spending. Consider summarizing the data by person by month or by department by month and analyze visually to determine if there are any unusual spikes or comparisons that should be investigated.
- **Unauthorized expenses or expenses approved above authorization limits** – Combine the master file of expense authorization with the expense reporting system. Join the limits associated with the specific people that are limited and perform an extraction of all items over limits identified. Consider summarized by person by date before doing this join to capture individuals that split their reimbursement up to avoid approval being required.

Fixed Assets

Fixed asset databases can be small or large depending on the type of company. Manufacturing companies tend to have significant improvements/purchases whereas a community-based not-for-profit may only have a few assets. Reconciling databases is important when considering completeness and fraud risks.

Common file requests can include general ledger, physical inventory count with tag ID, fixed asset register with depreciation calculations, and shipping/receiving logs.

- Join the physical inventory count with the fixed asset register by Tag ID. If both databases do not have a common factor, consider advising or creating one so that future reconciliations can be done with the click of a button.
- Analyze the receiving log close to cutoff with the physical count or date placed in service on the fixed asset register.
- Compare additions and deletions in the general ledger to the fixed asset roll forward or directly to the fixed asset register. Matching keys and coding the data are very important to execute these tasks with technology.
- Identify purchases/assets received that are not included in fixed assets (potential theft).

Check Register and Cash Disbursements

In general, misappropriation of assets at an entity will generally involve cash whether on the cash receipts side or the cash disbursements side. Therefore, various fraud tests can be run to isolate certain items from a check register to identify irregularities, or to isolate specific checks.

Area	Considerations
Gap Detection	Gap detection on check number; investigate significant gaps in checks
Significant Vendors	Summarize by vendor – document understanding of significant vendors and select on test basis
Significant Checks	Extract checks > a certain dollar value or approval limit
Unusual Vendors	Last names of employees; vendors with 1 check or minimal checks, round even numbers (shell company schemes, pass-through entity issues)
Related Party Considerations	Obtain listing of board members; obtain listing of board member affiliations if applicable (employment information; ownership interests; may be needed for 990 disclosure)
Completeness	Compare CD journal to disbursements indicated in general ledger—are you missing a portion of the population (wire transfers?)
Compare	Obtain a check register over a multiple year period and join that data together. Once joined, compare vendors' year over year to identify any significant or unusual trends. Consider filtering the data to identify instances whereby vendors started, vendors dropped off, or vendors have significant fluctuations in activity.

Revenue Considerations

Revenue is often the most significant risk area. The following are procedures that can be performed and questions asked to identify data analytics that can be performed:

Area	Considerations
Internal Controls	What are the organization's internal procedures surrounding revenue? Is the system integrated? Does the sales staff talk to the accounting staff? The controls will significantly impact the data available and the testing that can be performed.
Completeness	If the systems permit, match the revenue from the billing system to the general ledger revenue (reconcile differences such as basis of accounting, cash vs. non-cash, items not recorded, certain bequests with no valuation). Does the accounting staff corroborate the data/contracts provided by the sales staff?
Stratification	Stratify the population in a variety of ways: ■ Extract all amounts over a threshold (individually significant). ■ Segregate by a number (for example, average dollar value of transactions) or by a character (for example, sales by state). ■ Segregate outliers such as related party customer transactions from the population using key word extractions.
Summarization	Summarize the transaction register in a variety of ways: ■ Sales by month ■ Sales by product line ■ Sales by customer
Join	■ Join the sales journal and the purchases journal to do comparisons of margin by product line within a period of time. ■ Join the A/R journal and the sales journal and identify instances where current sales are a significant portion of AR (indicative of slow collection).

SAS No. 145 *Understanding the Entity and its Environment and Assessing the Risks of Material Misstatement*

SAS No.145, *Understanding the Entity and its Environment and Assessing the Risks of Material Misstatement*, supersedes SAS No. 122, as amended, section 315 and also includes amending various other sections. While the standard does not amend AU-C 520, *Analytical Procedures*, it includes extensive guidance regarding the use of information technology and the consideration of general IT controls in planning an audit and performing a risk assessment that includes analytical procedures. SAS No. 145 does not fundamentally change the key audit risk concepts. Rather, SAS No. 145 clarifies and enhances certain aspects of the identification and assessment of the risks of material misstatement to drive better risk assessment and, therefore, enhance audit quality.

The SAS became effective for audits of financial statements for periods ending on or after December 15, 2023 (2023 calendar year audits).

SAS No. 145 does not fundamentally change the key concepts underpinning audit risk, which is a function of the risks of material misstatement and detection risk. Rather, it clarifies and enhances certain aspects of the identification and assessment of the risks of material misstatement to drive better risk assessments and, therefore, enhance audit quality.

Performing a risk assessment

AU-C 200 states that audit risk is a function of the risk of material misstatement plus detection risk. The risk of material misstatement comprises inherent risk and control risk. The risk of material misstatement is found at the:

- Financial statement level: The risk is broad and pervasive, potentially affecting several account balances, classes of transactions and assertions. The auditor attempts to take the risk down to the account balance and assertion level but that is not always possible. Examples of overall financial risk could be a lack of competent employees in the accounting area or the auditor's experience that there are too few people to segregate duties. It could be a lax control environment giving rise to the risk of fraud that is not targeted to any one area. These are pervasive risks that are addressed by using more experienced personnel, closer review by experienced personnel and very little, if any, interim testing. The auditor is **no longer** required to assess whether overall financial statement risks are significant risks.
- Risk at the account balance and the assertion level. The risk relates to relevant assertions where specific preventive and detective control activities are able to minimize the risk. SAS 145 only requires the auditor to assess the risk of significant account balances, classes of transactions or disclosures and only for relevant assertions within those account balances and classes of transactions. Inherent risk and control risk must be assessed separately. Although the AICPA has been stressing this concept for several years, SAS 143 and SAS 145 put it in writing.

Understanding the entity and its environment

The auditor's requirement to understand aspects of the entity and its environment has not changed. The auditor will obtain an understanding of these factors primarily by inquiry and obtaining documents such as minutes or other update information.

- Entity's organizational structure, ownership and governance, and its business model, including the extent to which the business model integrates the use of IT

- Industry, regulatory, and other external factors
- Measures used, internally and externally, to assess the entity's financial performance
- Applicable financial reporting framework and the entity's accounting policies and the reasons for any changes
- How inherent risk factors affect the susceptibility of assertions to misstatement in the preparation of the financial statements in accordance with the applicable financial reporting framework, and the degree to which affect it
- Whether the entity's accounting policies are appropriate and consistent with the applicable financial reporting framework

The revisions to the existing standard enhance and emphasize the auditor's professional skepticism.

Analytical Procedures

The auditor performs analytical procedures as risk assessment procedures to help identify inconsistencies; unusual transactions or events; and amounts, ratios, and trends that indicate matters that may have audit implications. When unusual or unexpected relationships are identified, this may mean that there is a risk of material misstatement. The issue may be one of error or fraud.

When analytical procedures are performed as risk assessment procedures, they are typically performed at a high level on aggregated data. The auditor also performs final analytical procedures near the end of the audit and may perform substantive analytical procedures during the audit. The other types of analytical procedures are addressed in AU-C section 520. AU-C 520 requires the auditor to look for inconsistencies near the end of the audit as part of the conclusion about the financial statement presentation. AU-C 520 requires the auditor to set an expectation of plausible relationships that are reasonably expected to exist and evaluate the results of the test against the actual account balance/class of transaction for substantive analytical procedures. The auditor is required to follow up on amounts differences that exceed a certain threshold set by the auditor. Disaggregation of data enables a more precise expectation.

Preliminary analytical procedures are addressed in AU-C 315, which does not require the auditor to set an expectation although the application guidance states that it is helpful.

Conclusion

Performing data analytic procedures on engagements is becoming less and less a "nice to have but not required" and more of a requirement as more and more transactions are processed electronically.

As the market continues to tighten with increased competition and fee pressures, the reliance on doing more with less only becomes easier with technology. Work toward re-engineering the firm's audit and review engagement processes to arrive at a sustainable data analytics approach. And finally, EMBRACE CHANGE!

NOTES

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