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A survey of the use and perceptions of analytical procedures

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A Survey of the Use and Perceptions of Analytical Procedures

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INTRODUCTION

In order to comply with generally accepted auditing standards (GAAS), auditors are required to gather sufficient, competent evidence to support their opinion concerning the amounts and disclosures in the client's financial statements. Auditors have numerous ways by which to obtain such evidence, and one whose use is continually increasing--largely due to its cost-effectiveness--is analytical procedures.

Analytical procedures (APs) are defined as "evaluations of financial information made by a study of plausible relationships among both financial and non-financial data" (SAS No. 56). For non-auditors, an example of an AP is using historic gross profit percentages to determine if the gross profit percentage for the year under audit appears reasonable. Professional guidance on the use of APs originated in 1978 when they were recommended for use in audits by the Auditing Standards Board. Guidance culminated with the issuance of Statement on Auditing Standards No. 56 (SAS No. 56), which mandates the use of APs in both the planning and final review stages of audits.

Many research studies have investigated the use of APs. The methodologies employed range from surveys of practicing auditors (see Ameen and Strawser 1994; Biggs and Wild 1984; Tabor and Willis 1985) to case studies in which auditors were asked to utilize APs (see Heintz and White 1989; Holder 1983) to interviews with auditors from the Big Six firms (see Hirst and Koonce 1996).

In one of the more recent studies, Ameen and Strawser (1994) surveyed practicing auditors to determine the current use (as of 1991) of APs during audits and arrived at several major conclusions. In their research, Ameen and Strawser (1994) found that auditors tended to use simpler APs, such as comparison to prior year's balance or judgmental trend analysis, rather than their more sophisticated counterparts, such as time-series analysis and regression analysis, when performing audits. They also found that the use of APs constituted nearly one-third of total audit hours for smaller firms; the ratio increased to nearly one-half for Big Six firms. Also, Ameen and Strawser's research identified two major reasons for the heavy reliance on APs: increased fee pressure felt by public accounting firms and increased use of microcomputers in audits. It has been over 5 years since their data was gathered. Due to increased competition and exposure to liability litigation, auditors have needed to utilize procedures such as APs that would cost-effectively increase the effectiveness and efficiency of their audits. Also, the use of microcomputers during audits has continued to increase. Therefore the level of use of APs would be expected to increase.

In addition to updating previous research and identifying the current level of use of APs, this research was designed to explore new issues. Participating auditors were asked to identify the level of use of specific APs during each of the three stages of an audit identified by SAS No. 56: planning, substantive testing, and final review. Previous research (Ameen and Strawser 1994) did not separate the stages when questioning the level of use of APs. Second, the types of APs

provided to the respondents were revised and expanded. Third, the line of questioning was altered in an attempt to gather information as to the reasons why auditors choose to use various types of APs—primarily why auditors continue to choose simpler APs over more sophisticated APs even though previous research (e.g., Kinney 1978; Knechel 1986; Wilson and Colbert 1989) has shown that sophisticated APs are more effective during audits. Finally, this study investigated what factors have influenced the use of APs over the past five years.

The results of this research are of interest for standard setters, researchers, practitioners, and educators. For standard setters and researchers, this study provides an update to previous research and a more in-depth analysis of the use of APs in the various stages of an audit. It also researches topics suggested by previous researchers (Ameen and Strawser 1994, Hirst and Koonce 1996). For practitioners, it provides a better understanding of the current use of APs so it may be determined if more guidance is needed. For educators, this research may be used to complement textbook discussions of APs by illustrating how much and when different types of APs are used.

METHODOLOGY

The survey instrument used by Ameen and Strawser (1994) was obtained from the authors and modified accordingly. Consistent with previous research, respondents were asked to select one industry to use as a reference point while completing the survey. The purpose of this request was to focus the attention of

the respondents in order to discourage sweeping generalizations. Respondents were also asked to indicate the average size, in terms of total annual revenues and total assets, of their clients in the selected industry. The remainder of the survey was organized into four areas: Use of Analytical Procedures, Effectiveness of Analytical Procedures, Changes in the Use of Analytical Procedures, and Demographic Information.

In the first section, respondents were asked to indicate, using a seven-point scale ranging from (1) never used to (7) always used, how frequently they use each type of analytical procedure during each of the three stages of an audit: planning, substantive testing, and final review. The types of APs include (1) comparison of the current year account balance to the prior year's balance, (2) ratio analysis involving the current year account balance and its relationship with other account balances, (3) judgmental trend analysis, (4) comparison of financial ratios based upon the client's current year account balances with industry averages for those same financial ratios, (5) comparison of the current year account balance to the client's budgeted account balance, (6) comparison of the current year account balance to the expected balance generated by using relevant non-financial data, (7) formal statistical time-series analysis to estimate the current year account balance based on the account's balance from a number of previous years, and (8) formal statistical regression analysis to estimate the current year account balance based on its relationship with other account balances. Respondents were also given space to describe a type of analytical procedure

used by their firm which was not already listed; they were given this option throughout the survey.

In the second section, the respondents were asked to indicate, using a seven-point scale ranging from (1) not effective to (7) very effective, how effective they felt each of the types of APs were during the substantive testing stage of an audit. The substantive testing stage was chosen because it is the only stage of an audit during which SAS No. 56 does not require the use of APs yet it continues to be the stage in which the bulk of APs are used. After answering that question for each of the APs listed, the respondents were asked to review their responses. For those types of APs which the respondents indicated as being very effective (by assigning a score of 6 or 7) but which they had previously indicated they generally do not use (by assigning a score of 1 or 2) during the substantive testing stage of an audit, the respondents were asked to identify a few reasons why they do not choose to use that type of AP even though they feel it is effective.

The third section of the survey investigated changes in the use of APs. All respondents were asked to indicate the proportion of time spent during each stage of an audit using APs. From this point on, those respondents without at least five years of auditing experience were instructed to skip the remainder of this section and continue with the demographic information. Those respondents having at least five years of auditing experience were then asked to indicate what proportion of time was spent during an audit conducted five years ago using APs. Next, the respondents were asked to indicate, using a seven-point scale ranging from (-3)

large decrease to (+3) large increase, whether the use of each type of analytical procedure has increased or decreased during the substantive testing stage of an audit during the last five years. Again, the substantive testing stage was chosen because it is the only stage of an audit during which SAS No. 56 does not require the use of APs yet it continues to be the stage in which the bulk of APs are used. Finally, for only those types of APs whose use the respondents indicated as significantly increasing or decreasing during the last five years (by assigning a score of +/- 2 or 3), the respondents were asked to indicate what effect each of five factors has had on the change in the use of the specified APs. The factors provided included (1) an overall change in your firm's audit approach, (2) increased use of microcomputers makes use of this procedure easier, (3) increased fee pressure resulting in the need for cost-effective procedures, such as analytical procedures, and (4) increased training and/or guidance provided for the use of this procedure. The respondents were also invited to describe a factor not given but that had affected their use of one or more of the APs over the past five years.

The fourth section of the survey gathered demographic information on each respondent, including audit experience, type of firm in which they were currently employed, current position within the firm, professional certifications earned, and the number of people currently employed in the audit division of their office. A sample of the survey is included in Appendix A.

PARTICIPANTS

In order to efficiently distribute and collect surveys, one representative from eight offices of the Big Six firms and 17 offices of smaller firms located in Iowa and Minnesota was asked to serve as a contact person within their respective office. An agreed-upon number of surveys were then mailed to each contact person who distributed them among the audit professionals in the office with at least two to three years of auditing experience. The contact person collected the completed surveys and returned them. In this manner, surveys were distributed to 96 auditors working for Big Six firms and 92 auditors working for smaller firms.

As shown in Table 1, 72 and 70 completed surveys were returned by auditors working for Big Six and smaller firms, respectively. More than half of the total number of respondents were either manager/senior managers or senior/supervisors. The response of auditors at these levels within the firms is important since they are typically directly involved in the planning, substantive testing, and final review stages of most audits; they are also responsible for the supervision of staff and assistants.

RESULTS

Use and Effectiveness of APs

Consistent with the fact SAS No. 56 mandates the use of APs during the planning stage of all audits, the level of use of APs during this stage is high, as shown on Table 2. The most preferred type of AP, using the previous year's

balance, had a mean well over 6, on a scale of 1 to 7, for both smaller and Big Six firms. Table 2 also reveals that auditors prefer simpler types of APs over more sophisticated methods, such as time-series analysis and regression analysis. This finding is consistent with previous research (Ameen and Strawser 1994, Hirst and Koonce 1996). And, although the two groups tend to favor the same specific types of APs , the level of use is generally significantly higher for Big Six firms. As mentioned previously, throughout the survey respondents were provided with space in which to describe a type of AP used by their firm which was not already listed. Of the few responses provided (5 responses out of 142 participants), no type of AP appeared with any frequency—in fact, most of the "other" APs consisted of a combination of one or more of the APs already listed in the survey. Therefore, those responses have been omitted from the presented results.

Although auditors are not required to use APs during the substantive testing stage of an audit, the results show the level of use of specific APs to be quite high. This is shown in Table 3. Similar to the planning stage, use of the previous year's balance is the most favored type of AP for both smaller and Big Six firms. Likewise, auditors continue to favor simpler types of APs over the sophisticated APs. Specifically, the highest means for the sophisticated APs, 1.386 and 2.458 for smaller and Big Six firms, respectively, is considerably below the highest means for simpler APs, which were 5.514 and 6.194 for smaller and Big Six firms, respectively. Overall, the use by the Big Six firms is significantly higher for each

and every type of AP listed, indicating that Big Six firms rely on APs more than smaller firms during the substantive testing stage.

Table 4 compares the responses of auditors employed in only smaller firms regarding their use and perceived effectiveness of specific APs in the substantive testing stage. Perhaps not surprisingly, the scores for perceived effectiveness closely follow those for the level of use of the respective APs. It is surprising to note, however, how low the responses were regarding the perceived effectiveness of the sophisticated APs. The means for perceived effectiveness for time-series analysis and regression analysis were 2.561 and 2.712, respectively. This appears to be in conflict with previous research (Kinney 1978; Knechel 1986; Wilson and Colbert 1989) which showed these types of APs to be more effective during audits than their simpler counterparts. However incorrect the perceptions of auditors may be, this finding gives some insight into why auditors prefer simpler APs over the more sophisticated APs. It also suggests auditors may not be making use of current research.

The same comparison between level of use and perceived effectiveness for Big Six firms can be found in Table 5. The same relationships exist for Big Six firm respondents as they did for smaller firms in that the level of use tends to reflect the perceived effectiveness of the types of APs. Also the simpler APs are perceived to be more effective than the more sophisticated APs. However, the means of the perceived effectiveness for time-series analysis and regression analysis, which were 3.406 and 3.435, respectively, are greater for Big Six firms than smaller firms.

Although the low perceived effectiveness of the sophisticated APs conflicts with previous research (Kinney 1978; Knechel 1986; Wilson and Colbert 1989), it may suggest Big Six firms have greater access to current research than smaller firms.

After the respondents completed the questions regarding the perceived effectiveness of the specific APs, they were asked to review their responses. For those APs they had indicated as being very effective yet had previously indicated they did not use that AP during the substantive testing stage of audits, the respondents were asked to provide a short explanation of why they generally chose not to use that type of AP. Four types of APs were most commonly noted: comparison to industry ratios, comparison to client's budget, time-series analysis and regression analysis. In regards to using comparison to industry ratios, respondents communicated frustration with the lack of availability of such ratios and the dangers of generalizing the financial position of companies within industry groups. Referring to the use of comparison to client's budget, respondents indicated that their clients do not prepare formal budgets and thus preclude the use of this type of AP. Finally, in regards to time-series analysis and regression analysis, respondents commonly provided one of two responses: lack of software or expertise to use the statistical analysis, and cost-effectiveness of other types of APs. This finding gives tremendous insight into why auditors choose to use simpler APs over sophisticated APs. By these responses, it appears that although the use of microcomputers during audits has increased over time, the use of computer-dependent types of APs has not increased as anticipated. Likewise, it

appears that the population of auditors who recognize the effectiveness of more sophisticated APs also recognize the large amount of time required to use these APs. They are comfortable with the level of assurance provided by the simpler APs and do not feel the benefits of using sophisticated APs outweigh the related costs.

Table 6 summarizes the responses of smaller and Big Six firm participants regarding the level of use of specific APs during the final review stage of an audit. The use of APs during the final review stage is required by SAS No. 56. The trends are now unmistakable. Similar to the previous two stages examined, the use of simpler APs is preferred over the more sophisticated APs, with the use of previous year's balance again being found as the most frequently used type of AP. Between the two groups of auditors, only time-series analysis and regression analysis were found to have significantly different means.

Table 7 looks at the current use of APs in the various stages of an audit. The average proportion of total audit time spent using APs in each stage is shown. For smaller firms, the use of APs during both the planning and final review stages exceeded 40%, while the use during the substantive testing stage was over 27%. For Big Six firms, the use of APs during the planning, substantive testing, and final review stages approached 40%, 42%, and 49%, respectively. During the substantive testing stage--the only stage in which the use of APs is not required by SAS No. 56--the means for smaller and Big Six firms are significantly different, with the Big Six reporting a proportion of use more than one-and-a-half times greater.

Although previous research (Ameen and Strawser 1994) expressed doubt as to the validity of these proportions (since they appear to be quite high), when the above percentages are compared to the results of their study and of predecessor studies (Tabor and Willis 1985) the proportions appear consistent. Specifically, Ameen and Strawser (1994) found the proportions of time spent by smaller firms to be 37%, 33%, and 33% in the planning, substantive testing, and final review stages, respectively. For Big Six firms, the proportions were found to be 48%, 43%, and 55% in the planning, substantive testing, and final review stages, respectively. Although Tabor and Willis (1985) did not differentiate between smaller and Big Six firms, their results indicated usage of 42%, 36%, and 3% in the planning, substantive testing, and final review stages, respectively. (It is important to note that Tabor and Willis' study was conducted prior to the enactment of SAS No. 56 which mandates the use of APs in the final review stages of all audits.) Therefore, it would appear that auditors are using APs to a tremendous extent in each of the three stages of an audit, and this finding is not unique to the current study.

Changes in the Use of APs

For smaller firms, Table 8 compares the responses regarding the current level to the level of use of APs from five-years ago during each stage of the audit. While the use of APs by smaller firms during both the substantive testing and final review stages moderately increased over the past five years, by 28% and 18%,

respectively, the use of APs during the planning stage has increased dramatically--nearly doubling.

A similar comparison between current use of APs and use five years ago during each stage of an audit is made for Big Six firms in Table 9. In this group, while the planning and final review stages saw moderate increases, by 32% and 13%, respectively, the most significant change in use of APs occurred during the substantive testing stage--increasing by over 66%.

In Table 10, the results of questioning respondents regarding the changes in the use of specific types of APs during the substantive testing stage are summarized. Overall, the use of each type of AP was indicated as increasing. The AP with the greatest increase in use for smaller firms was the use of ratio analysis involving the account. For Big Six firms, statistically speaking, several APs tied for the greatest increase in use: ratio analysis involving the account, judgmental trend analysis, comparison to industry ratios, comparison to client's budget, and the use of relevant non-financial data. Compared between the groups, the changes indicated by Big Six firm respondents are generally greater than for the smaller firms. This is consistent with the tremendous increase in use of APs during the substantive testing stage found in Table 9 for Big Six firms. As show in Table 10, the use of the more sophisticated APs, time-series analysis and regression analysis, only increased by small amounts. This finding was not expected due to the continued increase in the use of microcomputers during audits over the past five years. However, this finding is consistent with the auditors'

earlier responses regarding their lack of use of the sophisticated APs during any of the three stages of an audit.

For those specific types of APs which the respondents noted as significantly increasing or decreasing over the past five years during the substantive testing stage, the respondents were asked to rate several factors as to their effect on the changes in the use of that AP. The respondents were also given a space in which to provide a change factor not listed. Although the use of each of the APs was indicated as increasing (see Table 10), no factor or set of factors stood out as having a more significant effect on the change in the use of APs during the substantive testing stage. The respondents indicated that all of the factors listed had a fairly large effect on the change of the use of the APs. The factors provided on the survey were as follows: (1) an overall change in your firm's audit approach; (2) increased use of microcomputers makes use of this procedure easier; (3) increased fee pressure resulting in the need for cost-effective procedures, such as analytical procedures; and (4) increased training and/or guidance provided for the use of this procedure. The participating auditors did not mention any additional factors not listed.

CONCLUSIONS

Several major trends regarding the use of APs during the various stages of the audit can be identified from the results of this survey. As expected, the level of use of APs has continued to increase over the past five years. Most of the change

has appeared to occur in the use of APs during the substantive testing stage and in the use of APs overall by Big Six firms. No single AP can account for this change; rather, auditors are increasing their usage of all APs, in particular the simpler APs. Auditors are continuing to rely on the use of simpler APs rather than more sophisticated types of APs, such as time-series analysis and regression analysis, despite the increased use of microcomputers during audits. The survey results appear to suggest that a reason for this tendency includes a low perception of the effectiveness of sophisticated APs. There is also a feeling that the potential benefits of using sophisticated APs do not outweigh the additional costs, such as the cost of appropriate hardware and software, and the extra time needed to identify, gather, and input the necessary data.

The results of this study are of interest to standard setters, practitioners, educators, and researchers. For standard setters, it supplies the current level of use of APs both in the aggregate for the three stages of an audit and in detail for each type of AP during each of the stages of an audit. This allows standard setters to evaluate whether additional guidance is needed on the general use of APs or on the use of specific types of APs.

For practitioners, it provides information regarding the use of APs in the auditing industry and compares the usage between Big Six firms and smaller firms. It may be used as a benchmark to compare a firm's usage of APs to the rest of the industry. It may also serve as feedback through which firms may evaluate whether APs are being used in accordance with firm policy and objectives.

This study provides a tool for educators with which they may supplement textbook material when discussing the use of APs. It supplies information regarding the current use of APs in each of the three stages of an audit and which types of APs are preferred by auditors. It may also highlight issues concerning the use of APs for which more attention needs to be devoted. For example, educators may wish to address the issue of low perceived effectiveness of sophisticated APs.

For researchers, this study provides current information regarding the use of APs and perhaps some insight into why auditors prefer the use of certain types of APs. Primarily, it suggests some reasons why auditors continue to prefer the use of simpler APs over the more sophisticated types of APs, such as time-series analysis and regression analysis. As a result, it provides a new foundation upon which additional research may develop.

TABLE 1
Profile of Participants

	Smaller Firm Auditors (n=70)	Big Six Firm Auditors (n=72)	Overall Sample (n=142)
Position Level:			
Partner	22	16	38
Manager/Senior Manager	13	29	42
Senior/Supervisor	24	24	48
Staff	11	3	14
Experience:			
Mean	10.79	8.20	9.48
Standard deviation	7.20	6.05	6.75
>5 years	48	45	93
Number of Professionals:			
1 - 20	54	0	54
21 - 40	16	2	18
41 - 75	0	29	29
76 - 100	0	8	8
101 - 250	0	29	29
Over 250	0	4	4
Industry:			
Agriculture	5	0	5
Construction	6	0	6
Health Care	7	7	14
High-Technology	0	11	11
Insurance	6	9	15
Manufacturing	18	25	43
Not-for-Profit	13	2	15
Other	13	17	30
Client statistics:			
Median revenues	$ 8,000,000	$ 150,000,000	
Median total assets	$ 6,000,000	$ 150,000,000	

TABLE 2
Use During the Planning Stage

	Smaller Firms	Big Six Firms
Previous Year's Balance	6.232[A] (1.045)	6.403[A] (1.002)
Ratio Analysis Involving Account	4.319[B] (1.667)	4.722[B] (1.513)
Judgmental Trend Analysis *	4.290[B] (1.949)	4.833[B] (1.592)
Comparison to Industry Ratios **	2.841[C] (1.605)	3.528[C] (1.687)
Comparison to Client's Budget ***	3.162[C] (1.936)	4.569[B] (1.546)
Use of Relevant Non-financial Data *	2.029[D] (1.435)	2.431[D] (1.287)
Time-series Analysis ***	1.232[E] (0.689)	1.833[DE] (1.101)
Regression Analysis ***	1.217[E] (0.661)	1.583[E] (0.900)

Note: 1 = never used, 7 = always used

Standard deviations are in parentheses

Means joined by common letters within a column do not significantly differ from one another based on Tukey's HSD tests at alpha=.05.

*** Means are significantly different between groups at $p < .01$.

** Means are significantly different between groups at $p < .05$.

* Means are significantly different between groups at $p < .10$.

TABLE 3
Use During the Substantive Testing Stage

	Smaller Firms	Big Six Firms
Previous Year's Balance ***	5.514[A]	6.194[A]
	(1.422)	(1.096)
Ratio Analysis Involving Account ***	4.443[B]	5.278[B]
	(1.451)	(1.281)
Judgmental Trend Analysis ***	4.586[B]	5.292[B]
	(1.765)	(1.305)
Comparison to Industry Ratios *	2.886[C]	3.333[C]
	(1.537)	(1.444)
Comparison to Client's Budget ***	3.014[C]	4.264[D]
	(1.827)	(1.601)
Use of Relevant Non-financial Data ***	3.100[C]	4.000[CD]
	(2.030)	(1.776)
Time-series Analysis ***	1.386[D]	2.458[E]
	(0.952)	(1.768)
Regression Analysis ***	1.386[D]	2.014[E]
	(1.054)	(1.409)

Note: For Use 1 = never used, 7 = always used
Standard deviations are in parentheses
Means joined by common letters within a column do not significantly differ from one another based on Tukey's HSD tests at alpha=.05.
*** Means are significantly different between groups at $p < .01$.
* Means are significantly different between groups at $p < .10$.

TABLE 4
Use and Effectiveness Compared During the Substantive Testing Stage - Smaller Firms

	Use	Effectiveness
Previous Year's Balance	5.514[A] (1.422)	5.457[A] (1.212)
Ratio Analysis Involving Account	4.443[B] (1.451)	5.129[A] (1.273)
Judgmental Trend Analysis	4.586[B] (1.765)	4.786[A] (1.587)
Comparison to Industry Ratios	2.886[C] (1.537)	3.667[B] (1.302)
Comparison to Client's Budget	3.014[C] (1.827)	3.565[B] (1.558)
Use of Relevant Non-financial Data	3.100[C] (2.030)	3.441[B] (1.888)
Time-series Analysis	1.386[D] (0.952)	2.561[C] (1.628)
Regression Analysis	1.386[D] (1.054)	2.712[C] (1.854)

Note for use: 1 = never used, 7 = always used
for effectiveness: 1 = not effective, 7 = very effective
Standard deviations are in parentheses
Means joined by common letters within a column do not significantly differ from one another based on Tukey's HSD tests at alpha=.05.

TABLE 5
Use and Effectiveness Compared During the Substantive Testing Stage - Big Six Firms

	Use	Effectiveness
Previous Year's Balance	6.194^{A} (1.096)	5.569^{A} (0.990)
Ratio Analysis Involving Account	5.278^{B} (1.281)	5.278^{AB} (1.153)
Judgmental Trend Analysis	5.292^{B} (1.305)	5.056^{ABC} (1.255)
Comparison to Industry Ratios	3.333^{C} (1.444)	4.306^{D} (1.263)
Comparison to Client's Budget	4.264^{D} (1.601)	4.583^{BCD} (1.340)
Use of Relevant Non-financial Data	4.000^{CD} (1.776)	4.375^{CD} (1.640)
Time-series Analysis	2.458^{E} (1.768)	3.406^{E} (1.639)
Regression Analysis	2.014^{E} (1.409)	3.435^{E} (1.667)

Note for use: 1 = never used, 7 = always used
for effectiveness: 1 = not effective, 7 = very effective
Standard deviations are in parentheses
Means joined by common letters within a column do not significantly differ from one another based on Tukey's HSD tests at alpha=.05.

TABLE 6
Use During the Final Review Stage

	Smaller Firms	Big Six Firms
Previous Year's Balance	6.443[A] (0.927)	6.486[A] (0.934)
Ratio Analysis Involving Account	4.914[B] (1.675)	4.764[B] (1.657)
Judgmental Trend Analysis	4.800[B] (1.893)	4.931[B] (1.595)
Comparison to Industry Ratios	3.700[C] (1.805)	3.333[C] (1.661)
Comparison to Client's Budget	3.203[CD] (1.906)	3.681[C] (1.759)
Use of Relevant Non-financial Data	2.429[D] (1.664)	2.528[D] (1.404)
Time-series Analysis ***	1.314[E] (0.790)	1.806[DE] (1.158)
Regression Analysis **	1.286[E] (0.887)	1.625[E] (0.999)

Note for use: 1 = never used, 7 = always used
Standard deviations are in parentheses
Means joined by common letters within a column do not significantly differ from one another based on Tukey's HSD tests at alpha=.05.
*** Means are significantly different between groups at $p < .01$.
** Means are significantly different between groups at $p < .05$.

TABLE 7
Current Use of APs in the Various Stages of the Audit

	Smaller Firms	Big Six Firms
Planning Stage	40.768 (30.075)	39.597 (28.424)
Substantive Testing Stage ***	27.286 (19.494)	41.736 (19.010)
Final Review Stage	41.300 (30.420)	48.611 (32.439)

Note: Averages reflect proportion of total audit time spent using APs in each stage.
Standard deviations are in parentheses.
*** Means are significantly different between groups at $p < .01$.

TABLE 8
Current and Prior Use of APs
in the Various Stages of the Audit - Smaller Firms

	Current	5-Years Ago
Planning Stage	40.768 (30.075)	22.957 (24.686)
Substantive Testing Stage	27.286 (19.494)	21.277 (19.609)
Final Review Stage	41.300 (30.420)	35.128 (31.188)

Note: Averages reflect proportion of total audit time spent using APs in each stage.
Standard deviations are in parentheses.

TABLE 9
Current and Prior Use of APs
in the Various Stages of the Audit - Big Six Firms

	Current	5-Years Ago
Planning Stage	39.597 (28.424)	30.000 (25.562)
Substantive Testing Stage	41.736 (19.010)	25.111 (15.244)
Final Review Stage	48.611 (32.439)	42.889 (27.849)

Note: Averages reflect proportion of total audit time spent using APs in each stage.
Standard deviations are in parentheses.

TABLE 10
Changes in the Use of Specific APs in the Substantive Testing Stage

	Smaller Firms	Big Six Firms
Previous Year's Balance	0.771^{A} (0.881)	0.844^{A} (1.065)
Ratio Analysis Involving Account	0.917^{B} (0.767)	1.089^{B} (0.996)
Judgmental Trend Analysis **	0.604^{A} (0.707)	0.956^{B} (0.952)
Comparison to Industry Ratios ***	0.542^{A} (0.771)	1.422^{B} (0.965)
Comparison to Client's Budget ***	0.319^{AC} (0.726)	1.022^{B} (1.033)
Use of Relevant Non-financial Data **	0.458^{AC} (0.798)	0.955^{B} (1.506)
Time-series Analysis	0.063^{C} (0.598)	0.267^{A} (0.939)
Regression Analysis	0.042^{C} (0.651)	0.200^{A} (1.140)

Note: -3 = significant decrease, +3 = significant increase
Standard deviations are in parentheses
Means joined by common letters within a column do not significantly differ from one another based on Tukey's HSD tests at alpha=.05.
*** Means are significantly different between groups at $p < .01$.
** Means are significantly different between groups at $p < .05$.

APPENDIX A

Since the use of analytical procedures may differ greatly from one type of audit client to another, it is important for you to answer the following questions using only one industry as a reference point. For purposes of this study, you should select an industry with which you are very familiar. Please indicate the industry that you will use as a reference in responding to this survey's questions (select only one):

_____Agriculture
_____Banks and/or Savings & Loans
_____Health Care
_____High-technology
_____Insurance
_____Manufacturing
_____Not-for-profit
_____Retail
_____Service
_____Utilities

_____Other (please indicate)_____

Please indicate below the average size of your clients in the industry you have selected above:

Total revenues_____ Total assets_____

PART A: THE USE OF ANALYTICAL PROCEDURES

When discussing analytical procedures, the auditing standards identify three stages of an audit: planning, substantive testing, and final review (at the conclusion of the audit to assess the overall reasonableness of the financial statements). Please indicate **how frequently** you use each of the following types of analytical procedures during the indicated stage of the audit:

	Never			**Sometimes**			**Always**
1. Comparison of the current year account balance to the prior year's balance during:							
a. planning	1	2	3	4	5	6	7
b. substantive testing	1	2	3	4	5	6	7
c. final review	1	2	3	4	5	6	7
2. Ratio analysis involving the current year account balance and its relationship with other account balances during:							
a. planning	1	2	3	4	5	6	7
b. substantive testing	1	2	3	4	5	6	7
c. final review	1	2	3	4	5	6	7
3. Judgmental trend analysis (i.e., evaluating the current year account balance judgmentally after considering the account's balance from a number of previous years) during:							
a. planning	1	2	3	4	5	6	7
b. substantive testing	1	2	3	4	5	6	7
c. final review	1	2	3	4	5	6	7

	Never			Sometimes			Always
4. Comparison of financial ratios based upon the client's current year account balances with industry averages for those same financial ratios during:							
a. planning	1	2	3	4	5	6	7
b. substantive testing	1	2	3	4	5	6	7
c. final review	1	2	3	4	5	6	7
5. Comparison of the current year account balance to the client's budgeted account balance during:							
a. planning	1	2	3	4	5	6	7
b. substantive testing	1	2	3	4	5	6	7
c. final review	1	2	3	4	5	6	7
6. Comparison of the current year account balance to the expected balance generated by using relevant non-financial data (e.g., square feet of selling space to estimate total sales) during:							
a. planning	1	2	3	4	5	6	7
b. substantive testing	1	2	3	4	5	6	7
c. final review	1	2	3	4	5	6	7
7. Formal statistical time-series analysis (i.e., using statistical formulas and/or software) to estimate the current year account balance based on the account's balance from a number of previous years during:							
a. planning	1	2	3	4	5	6	7
b. substantive testing	1	2	3	4	5	6	7
c. final review	1	2	3	4	5	6	7
8. Formal statistical regression analysis to estimate the current year account balance based on its relationship with other account balances during:							
a. planning	1	2	3	4	5	6	7
b. substantive testing	1	2	3	4	5	6	7
c. final review	1	2	3	4	5	6	7
9. If your firm uses a type of analytical procedure not listed above, please describe it below.							
Description:_____							
Use during:							
a. planning	1	2	3	4	5	6	7
b. substantive testing	1	2	3	4	5	6	7
c. final review	1	2	3	4	5	6	7

PART B: EFFECTIVENESS OF ANALYTICAL PROCEDURES

Please indicate **how effective** you feel each of the following types of analytical procedures is (in terms of providing audit evidence) during the **substantive testing stage** of the audit:

	Not Effective			Somewhat Effective			Very Effective
1. Comparison of the current year account balance to the prior year's balance	1	2	3	4	5	6	7
2. Ratio analysis involving the current year account balance and its relationship with other account balances	1	2	3	4	5	6	7
3. Judgmental trend analysis (i.e., evaluating the current year account balance judgmentally after considering the account's balance from a number of previous years)	1	2	3	4	5	6	7
4. Comparison of financial ratios based upon the client's current year account balances with industry averages for those same financial ratios	1	2	3	4	5	6	7
5. Comparison of the current year account balance to the client's budgeted account balance	1	2	3	4	5	6	7
6. Comparison of the current year account balance to the expected balance generated by using relevant non-financial data (e.g., square feet of selling space to estimate total sales)	1	2	3	4	5	6	7
7. Formal statistical time-series analysis (i.e., using statistical formulas and/or software) to estimate the current year account balance based on the account's balance from a number of previous years	1	2	3	4	5	6	7
8. Formal statistical regression analysis to estimate the current year account balance based on its relationship with other account balances	1	2	3	4	5	6	7
9. If your firm uses a type of analytical procedure not listed above, please describe it below.	1	2	3	4	5	6	7

Description:_____

_____

If you indicated you feel a type of analytical procedure is **effective** (by having circled a 6 or 7 in Part B immediately above) **but** for that same type of analytical procedure you indicated you **do not generally use it** during the **substantive testing stage** (by having circled a 1 or 2 in Part A), please identify by number the analytical procedure(s) in the space provided below. Additionally, briefly identify why you do not generally choose to use that type of analytical procedure during the substantive testing stage of an audit even though you feel it is effective.

_____

_____

_____

_____

_____

_____

PART C: CHANGES IN THE USE OF ANALYTICAL PROCEDURES

1. In general, what **proportion of time** is spent during an audit using analytical procedures? Please indicate the appropriate percentage from zero percent to 100 percent for each of the three stages of the audit listed below. Each blank should be rated from zero percent to 100 percent, where zero percent indicates that analytical procedures are not used at all in that stage and 100 percent indicates that analytical procedures are the sole form of testing used in that stage.

PLANNING STAGE _____

SUBSTANTIVE TESTING STAGE _____

FINAL REVIEW STAGE _____

==========

If you have less than five years of auditing experience, skip the remainder of this section and continue with Part D (page 10). If you have five years of auditing experience or more, please continue to the following questions.

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2. In general, **during an audit conducted five years ago**, what proportion of time was spent using analytical procedures? Please indicate the appropriate percentage from zero percent to 100 percent for each of the three stages of the audit listed below. Again, each blank should be rated from zero percent to 100 percent, where zero percent indicates that analytical procedures are not used at all in that stage and 100 percent indicates that analytical procedures are the sole form of testing used in that stage.

PLANNING STAGE _____

SUBSTANTIVE TESTING STAGE _____

FINAL REVIEW STAGE _____

Based on your experiences, please indicate whether you feel that the use of each of the following analytical procedures during the substantive testing stage of the audit has **increased or decreased** in the last five years:

	Large Decrease			**No Change**			**Large Increase**
1. Comparison of the current year account balance to the prior year's account balance	-3	-2	-1	0	1	2	3
2. Ratio analysis involving the current year account balance and its relationship with other account balances	-3	-2	-1	0	1	2	3
3. Judgmental trend analysis (i.e., evaluating the current year account balance judgmentally after considering the account's balance from a number of previous years)	-3	-2	-1	0	1	2	3
4. Comparison of financial ratios based upon the client's current year account balances with industry averages for those same financial ratios	-3	-2	-1	0	1	2	3
5. Comparison of the current year account balance to the client's budgeted account balance	-3	-2	-1	0	1	2	3
6. Comparison of the current year account balance to the expected balance generated by using relevant non-financial data (e.g., square feet of selling space to estimate total sales)	-3	-2	-1	0	1	2	3
7. Formal statistical time-series analysis (i.e., using statistical formulas and/or software) to estimate the current year account balance based on the account's balance from a number of previous years	-3	-2	-1	0	1	2	3
8. Formal statistical regression analysis to estimate the current year account balance based on its relationship with other account balances	-3	-2	-1	0	1	2	3
9. If your firm uses a type of analytical procedure not listed above, please describe it below.	-3	-2	-1	0	1	2	3

Description:_____

_____

Please answer this question for **only** those types of analytical procedures whose use during the substantive testing stage of an audit you indicated as **significantly increasing or decreasing** during the last five years (by having circled a +/- 2 or 3 in the section immediately above). (Please ignore the questions in this section to which the criterion above does not apply; therefore, it is possible that many or all of the questions will not need to be answered.) After locating the appropriate question number(s), please indicate what effect each of the following factors has had on the change in the use of those types of analytical procedures during the last five years:

	No Effect			**Some Effect**			**Large Effect**
1. Comparison of the current year account balance to the prior year's account balance							
a. An overall change in your firm's audit approach	1	2	3	4	5	6	7
b. Increased use of microcomputers makes use of this procedure easier	1	2	3	4	5	6	7
c. Increased fee pressure resulting in the need for cost-effective procedures, such as analytical procedures	1	2	3	4	5	6	7
d. Increased training and/or guidance provided for the use of this procedure	1	2	3	4	5	6	7
e. Other_____ _____	1	2	3	4	5	6	7
2. Ratio analysis involving the current year account balance and its relationship with other account balances							
a. An overall change in your firm's audit approach	1	2	3	4	5	6	7
b. Increased use of microcomputers makes use of this procedure easier	1	2	3	4	5	6	7
c. Increased fee pressure resulting in the need for cost-effective procedures, such as analytical procedures	1	2	3	4	5	6	7
d. Increased training and/or guidance provided for the use of this procedure	1	2	3	4	5	6	7
e. Other_____ _____	1	2	3	4	5	6	7

	No Effect						Some Effect
3. Judgmental trend analysis (i.e., evaluating the current year account balance judgmentally after considering the account's balance from a number of previous years)							
a. An overall change in your firm's audit approach	1	2	3	4	5	6	7
b. Increased use of microcomputers makes use of this procedure easier	1	2	3	4	5	6	7
c. Increased fee pressure resulting in the need for cost-effective procedures, such as analytical procedures	1	2	3	4	5	6	7
d. Increased training and/or guidance provided for the use of this procedure	1	2	3	4	5	6	7
e. Other_____	1	2	3	4	5	6	7
4. Comparison of financial ratios based upon the client's current year account balances with industry averages for those same financial ratios							
a. An overall change in your firm's audit approach	1	2	3	4	5	6	7
b. Increased use of microcomputers makes use of this procedure easier	1	2	3	4	5	6	7
c. Increased fee pressure resulting in the need for cost-effective procedures, such as analytical procedures	1	2	3	4	5	6	7
d. Increased training and/or guidance provided for the use of this procedure	1	2	3	4	5	6	7
e. Other_____	1	2	3	4	5	6	7
5. Comparison of the current year account balance to the client's budgeted account balance							
a. An overall change in your firm's audit approach	1	2	3	4	5	6	7
b. Increased use of microcomputers makes use of this procedure easier	1	2	3	4	5	6	7

	No Effect			Some Effect			Large Effect
c. Increased fee pressure resulting in the need for cost-effective procedures, such as analytical procedures	1	2	3	4	5	6	7
d. Increased training and/or guidance provided for the use of this procedure	1	2	3	4	5	6	7
e. Other_____ _____	1	2	3	4	5	6	7
6. Comparison of the current year account balance to the expected balance generated by using relevant non-financial data (e.g., square feet of selling space to estimate total sales)							
a. An overall change in your firm's audit approach	1	2	3	4	5	6	7
b. Increased use of microcomputers makes use of this procedure easier	1	2	3	4	5	6	7
c. Increased fee pressure resulting in the need for cost-effective procedures, such as analytical procedures	1	2	3	4	5	6	7
d. Increased training and/or guidance provided for the use of this procedure	1	2	3	4	5	6	7
e. Other_____ _____	1	2	3	4	5	6	7
7. Formal statistical time-series analysis (i.e., using statistical formulas and/or software) to estimate the current year account balance based on the account's balance from a number of previous years							
a. An overall change in your firm's audit approach	1	2	3	4	5	6	7
b. Increased use of microcomputers makes use of this procedure easier	1	2	3	4	5	6	7
c. Increased fee pressure resulting in the need for cost-effective procedures, such as analytical procedures	1	2	3	4	5	6	7
d. Increased training and/or guidance provided for the use of this procedure	1	2	3	4	5	6	7
e. Other_____ _____	1	2	3	4	5	6	7

	No Effect						Some Effect / Large Effect
8. Formal statistical regression analysis to estimate the current year account balance based on its relationship with other account balances							
a. An overall change in your firm's audit approach	1	2	3	4	5	6	7
b. Increased use of microcomputers makes use of this procedure easier	1	2	3	4	5	6	7
c. Increased fee pressure resulting in the need for cost-effective procedures, such as analytical procedures	1	2	3	4	5	6	7
d. Increased training and/or guidance provided for the use of this procedure	1	2	3	4	5	6	7
e. Other_____ _____	1	2	3	4	5	6	7

9. If your firm uses a different type of analytical procedure not listed above, please describe it below.

Description:_____

_____

a. An overall change in your firm's audit approach	1	2	3	4	5	6	7
b. Increased use of microcomputers makes use of this procedure easier	1	2	3	4	5	6	7
c. Increased fee pressure resulting in the need for cost-effective procedures, such as analytical procedures	1	2	3	4	5	6	7
d. Increased training and/or guidance provided for the use of this procedure	1	2	3	4	5	6	7
e. Other_____ _____	1	2	3	4	5	6	7

PART D: DEMOGRAPHIC INFORMATION

1. Audit experience (in years)

_____ Big Six firm
_____ National firm
_____ Regional firm
_____ Local firm
_____ Sole practitioner

2. Place an "X" beside the type of firm which most closely describes your current employer

_____ Big Six firm
_____ National firm
_____ Regional firm
_____ Local firm
_____ Sole practitioner

3. What is your current position within the firm?

_____ Partner
_____ Manager/Senior Manager
_____ Senior/Supervisor
_____ Staff

4. Circle any of the following certifications that you have earned:

CPA CIA CMA Other (identify) _____

5. How many people are currently employed in the audit division of your office?

_____ 1 - 10
_____ 11 - 20
_____ 21 - 30
_____ 31 - 40
_____ 41 - 50
_____ 51 - 75
_____ 76 - 100
_____ 101 - 250
_____ over 250

THANK YOU VERY MUCH FOR YOUR PARTICIPATION!!

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