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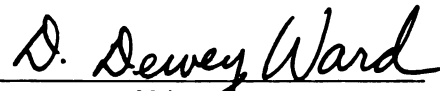
Modeling External Auditors' Evaluations
of Audit Risk and the Effect of the
Task Environment on Consensus

presented by

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has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Accounting


Major professor

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MODELING EXTERNAL AUDITORS' EVALUATIONS
OF AUDIT RISK AND THE EFFECT OF THE
TASK ENVIRONMENT ON CONSENSUS

By

Frank Alan Orth Buckless

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Accounting

1989

ABSTRACT**MODELING EXTERNAL AUDITORS' EVALUATIONS
OF AUDIT RISK AND THE EFFECT OF THE
TASK ENVIRONMENT ON CONSENSUS****By****Frank Alan Orth Buckless**

The objective of the study was to examine auditor judgments related to audit risk. The auditing literature suggests that the auditor's ability to evaluate and manage audit risk is crucial to the successful planning of an audit engagement. However, the auditing literature does not provide specific guidance on how to assess audit risk. The purpose of this study was to provide information on what factors are involved in the assessment of audit risk and to provide insight into the manner auditors assess audit risk.

Two interrelated experiments were conducted to achieve the above objective. The first experiment was concerned with determining the relative influence of various risk cues on auditors' risk assessments. In this experiment, audit managers were given a list of risk cues and asked to indicate the relative influence of these cues on their risk assessments. The audit managers were assigned to one of two groups. One group evaluated the risk cues with respect to a specific account. The other group evaluated the risk cues with respect to a specific audit objective.

The second experiment was concerned with modeling auditors' subjective assessments of audit risk and examining the effect of the judgment task on auditor risk assessments. In this experiment, audit managers were asked to evaluate the audit risk of several audit cases.

The case profiles presented varied manipulations to risk components. The manipulations were selected based on the first experiment. Again, audit managers evaluated the audit cases either with respect to a specific account or with respect to a specific audit objective. The experiment employed a 2 x 2³ mixed factorial design.

The findings of the study are summarized by four major points. First, auditor risk assessments are differentially affected by risk cues. Second, auditors combine risk components in a additive fashion and are achieving lower audit risk than suggested by the audit risk model exhibited in the authoritative literature. Third, auditor risk assessments are affected by the judgment task. Finally, consensus is higher for risk assessments made with respect to audit objectives as compared to risk assessment made with respect to accounts.

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ACKNOWLEDGMENTS

I would like to express my appreciation for the guidance, support and encouragement of my dissertation committee, Chairman D. Dewey Ward, Susan F. Haka and John E. Hunter.

I would like to thank the accounting firms and auditors who generously contributed their time and expertise to the experiments. A special thanks goes to Lynford E. Graham of Coopers & Lybrand, whose help in developing the case materials was invaluable.

Finally, thanks to my wife, Donna, for her encouragement and support throughout the long process.

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CHAPTER I

INTRODUCTION

1. Introduction

The overall objective of an external audit is to express an opinion as to the fairness, consistency and adherence to generally accepted accounting principles of a client's financial statements. SAS No. 47 [1983] points out the need to assess the risk underlying the auditor's opinion. At the financial statement level audit risk is defined as the risk that the auditor may unknowingly fail to appropriately modify his opinion on financial statements that are materially misstated (AICPA, 1983, Par. 2). SAS No. 47 further notes that this risk is a product of three separate risks (AICPA, 1983):

- The risk that a material error could occur.
- The risk that the system of internal accounting controls will not prevent or detect a material error which could occur.
- The risk that the auditor's audit procedures would not detect a material error which could exist.

The first two components of audit risk are essentially beyond the control of the auditor while the third component is under the auditor's direct control. The third component is controlled by the auditor through the selection and performance of audit procedures.

Although the auditor cannot control the level of risk for the first two components, their assessment is essential to the successful completion of an audit engagement. The selection and performance of audit procedures is based on the auditor's expectations of material errors occurring. This is the combined risk of the first two components. Once the desired level of audit risk has been determined

the auditor's assessment of the risk of material errors occurring can be used to determine the appropriate level of substantive audit procedures to be performed. If the auditor's expectation of errors is low, little audit work will be required. On the other hand, if the auditor's expectations of errors is high, substantial audit work will be required. The above discussion suggests that as the auditor's expectations of errors increases, the risk associated with the performance of audit procedures must decrease in order to maintain the pre-set desired level of audit risk.

The first standard of field work requires that the auditor adequately plan the audit. The assessment of the components of audit risk play an important role in the planning of an audit. The auditors assessment of the first two risk components has a direct influence on the nature, timing and extent of substantive audit procedures performed. The third component of audit risk is reduced by performing substantive audit procedures.

The above discussion suggests that the auditor's ability to evaluate and manage audit risk is crucial to the successful planning of an audit engagement. However, the authoritative literature does not provide specific guidance on how to assess audit risk. Risk assessment is left to the auditor's professional judgment. The auditor's assessment of audit risk is intuitive in nature and often implicit. The purpose of this study is to provide information on what factors are involved in the assessment of audit risk and to provide insight into the manner auditors assess audit risk. There has been very little research conducted in this area of audit planning. Felix and Kinney

[1982] note that descriptive research related to the auditor's initial planning process is virtually non-existent.

The major goals of judgment research in auditing are to understand, evaluate, and improve audit decisions [Ashton, 1983, p. 7]. This study should improve auditor judgments by making auditors more sensitive to both the planning phase judgment process and the limitations of this process.

1.1 Statement of problem

This section discusses current authoritative literature concerning audit risk as well as outlining the research questions which will be addressed by this study.

Audit risk is discussed in three separate pronouncements issued by the Auditing Standards Board (ASB) of the American Institute of Certified Public Accountants (AICPA). SAS No. 1 [1973] was the first pronouncement to discuss audit risk. SAS No. 1 notes that the risk underlying the auditor's opinion is a product of two separate risks (AICPA, 1973):

- The risk that material errors will occur in the accounting process by which financial statements are developed.
- The risk that any material errors that occur will not be detected in the auditor's examination of the financial statements.

SAS No. 1 [1973] further explains that an auditor relies on internal controls to reduce the first risk and depends on substantive auditing procedures to reduce the second risk. These concepts were expressed by the following formula (AICPA, 1973, par. 320b.35):

$$S = 1 - \frac{(1 - R)}{(1 - C)} \quad (1)$$

Where: S - reliability level for substantive tests.

 R - combined reliability level desired for substantive and compliance testing.

 C - reliance assigned to internal accounting control and other relevant factors.

The statement does not specify how to determine these reliabilities. It indicates that this determination is a matter for professional judgement.

In June 1981, the AICPA issued SAS No. 39 [1981] superseding section 320B of SAS No. 1 [1973]. This was an original attempt by the AICPA to define and measure audit risk. The two major changes from SAS No. 1 [1973] were that 1) explicit recognition was given to audit procedures other than substantive testing and 2) the formula was expressed in terms of risk whereas before it had been expressed in terms of reliability (the complement of risk). SAS No. 39 presented the following formulation (AICPA, 1981, Appendix par. 4):

$$\text{TDR} = \frac{\text{UR}}{(\text{IC} \times \text{ARR})} \quad (2)$$

Where: UR - allowable ultimate risk that the financial statements are materially misstated (i.e. audit risk).

 IC - assessment of the risk that the internal control system fails to detect errors greater than tolerable or acceptable error if they occur.

 ARR - assessment of the risk that analytical review and other relevant substantive tests would fail to detect errors greater than tolerable error if they occurred and were not detected by internal control.

 TDR - allowable risk of incorrect acceptance for the substantive test of details given that an error greater than the tolerable error has occurred and not been detected by internal control, analytical review or other substantive tests.

In December 1983, the AICPA issued SAS No. 47 [1983] which sets forth the current audit risk model. In this statement audit risk is defined as the risk that auditors may unknowingly fail to appropriately modify their opinion on financial statements that are materially misstated (AICPA, 1983, par. 2). Audit risk (AR) is assumed to be a multiplicative function of inherent risk (IR), control risk (CR), and detection risk (DR) and is represented by the following formula (AICPA, 1983, par. 20):

$$AR = IR \times CR \times DR \quad (3)$$

Where:

- AR - the risk that monetary errors greater than tolerable error might remain undetected in the account balance or class of transactions after the auditor has completed all audit procedures deemed necessary.
- IR - the susceptibility of an account balance or class of transactions to error that could be material assuming that there were no related internal accounting controls.
- CR - the risk that an error that could be material will not be prevented or detected by the system of internal accounting controls.
- DR - the risk that an auditor's procedures will lead him/her to conclude that an error that could be material does not exist when in fact such an error does exist.

These conditional definitions enable the components to be combined multiplicatively since they are independent by definition. Two key statements of SAS No. 47 [1983] are that 1) the appropriate level of audit risk is a matter for professional judgment and 2) audit risk may be assessed using quantitative or qualitative terms.

Two changes from SAS No. 39 [1981] were 1) SAS No. 47 [1983] explicitly recognized inherent risk' and 2) SAS No. 47 [1983] combined analytical review risk and tests of details risk. Neither model was intended to supersede or replace the other. Each model is a slight modification of the other model.

A major source of criticism with the audit risk model relates to the lack of independence between inherent risk and control risk. Cushing and Loebbecke [1983] give some examples of these interdependencies. For example, if control risk is high because the system of processing controls is bad, employees will be tempted to commit fraudulent acts at a greater frequency than if the controls were good, simply because they have less risk of getting caught. This implies that inherent risk would be greater. Kinney [1988] indicates that it is difficult to assess inherent risk and control risk separately because of these interdependencies. Inherent risk and control risk could be conceived as components of a general "environment" factor. Since this study is primarily concerned with the integration of risk components not their assessment, inherent risk and control risk will be combined to form a general environment factor called expectations of errors. The risk components examined in this study will be expectations of errors (EE), analytical review risk (ARR) and tests of details risk (TDR).

The audit risk model can be used as a planning tool once the desired level of audit risk has been determined. The auditor's

' SAS No. 39 [1981] implicitly set inherent risk equal to one as it was felt that an evaluation of such a risk would be difficult and potentially costly to quantify.

determination of the desired level of audit risk can be used in conjunction with his/her assessment of expectations of errors and analytical review risk to determine the appropriate level for test of details risk. The formulation of the audit risk model in the audit planning phase is as follows:

$$\text{TDR} = \frac{\text{AR}}{(\text{EE} \times \text{ARR})} \quad (4)$$

Where: EE = the risk that a material error 1) could occur in an account balance (inherent risk) and 2) not be prevented or detected on a timely basis by the entity's internal control structure (control risk).

The audit risk model suggests certain relationships that should affect audit planning decisions. Some of the relationships suggested by the audit risk model will be tested by the current research effort. The multiplicative nature of the model implies that the impact of a change in analytical review risk on the appropriate level of tests of details risk varies depending on the assessed level of expectations of errors. For example, Table 1.1 indicates that a change in analytical review risk from 50% to 25% has a greater impact on the required level of test of details risk when expectations of errors is equal to 25% than when it is equal to 50%. Performing analytical review procedures will reduce the required level of substantive tests of details by a greater amount when expectations of errors is low as compared to when it is high. The following research question will be addressed by the current study:

- 1) How do auditors combine information on the components of the audit risk model in forming their audit risk assessments?

TABLE 1.1
Required Levels of TDR for Various Assessments of
EE and ARR, with Desired AR = .05

<u>EE</u>	<u>ARR</u>			
	10%	25%	50%	100%
10%	*	*	100.0%	50.0%
25%	*	80.0%	40.0%	20.0%
50%	100.0%	40.0%	20.0%	10.0%
100%	50.0%	20.0%	10.0%	5.0%

- * - The conventional interpretation of cases in which planned TDR is greater than 1.0 is that available audit evidence renders the substantive tests of details unnecessary. However, considering the authoritative literature it may be more appropriate to say that it is unnecessary to perform substantive tests of details above the minimum level required².

The model also implies that a change in any one of the components will have an equivalent effect on the appropriate level of tests of details risk. For example, a decrease of 25% in ARR combined with an increase of 25% in EE will yield the same TDR, assuming a constant AR. Increasing expectations of errors and decreasing analytical risk by the same amount will not affect the required level of substantive tests of details. The following research question will be addressed by the current study:

- 2) What are the weights auditors assign to each of the components of the audit risk model?

² Some statements on auditing standards may require specific tests of financial statement balances for specific financial assertions. For example, see SAS No. 1, section 331 (AICPA, 1973), concerning confirmation of receivables and observation of inventories.

Both SAS No. 39 [1981] and SAS No. 47 [1983] indicate that the assessment of audit risk should be performed at a disaggregated level. However, it is unclear what the appropriate level of disaggregation should be.

Cushing and Loebbecke [1983] indicate that the audit risk model should be applied on a disaggregated level to the lowest audit element in the process which links each of the model's components. They indicate that this would be a particular type of error within a particular type of transaction affecting a specific financial statement account. Discussions of the auditing process in the auditing literature indicate that auditors divide the financial statements into components for which detailed audit objectives are specified³. Individual audit procedures are performed to gather support for one or more of these individual audit objectives. When sufficient competent evidence is gathered in support of each individual audit objective the auditor then aggregates and extends his/her conclusions to formulate an opinion on the statements taken as a whole. In terms of the audit risk model this process suggests that audit risk should be assessed with respect to specific audit objectives within accounts (e.g. accounts receivable). Moreover, a recent statement on auditing standards issued by the AICPA entitled "Consideration of the Internal Control Structure in a Financial Statement Audit" (SAS No. 55, AICPA, 1988) indicates that auditors should evaluate control risk with respect to specific audit objectives. This study will investigate the assessment of audit risk with respect to a specific account and a specific audit objective

³ See Section 1.2 where a model of the audit process is discussed.

within an account to see what effect, if any, the judgment task has on auditor decisions. The following two research questions will be addressed by the current study:

- 3) What effect does the judgment task have on the auditors' risk assessments?
- 4) What effect does the judgment task have on the degree of consensus among auditors?

In summary, the audit risk model will be used as a descriptive model of auditor behavior to generate hypotheses. The current study will test some of the implications of the audit risk model. Hypotheses will be developed and tested for the following research questions:

- 1) How do auditors combine information on the components of the audit risk model in forming audit risk assessments?
- 2) What are the weights auditors assign to each of the components of the audit risk model?
- 3) What effect does the judgment task have on the auditors' risk assessments?
- 4) What effect does the judgment task have on the degree of consensus among auditors?

This research effort will also address the following secondary question for which no hypothesis was developed:

- 5) What risk cues do auditors consider most important when evaluating expectations of errors, analytical review risk and tests of details risk?

The auditor's assessment of audit risk is intuitive in nature and often implicit. Whether the auditor's intuitive judgment is consistent with the audit risk model is an empirical question. The results of this study should provide evidence on whether, and if so, how the audit risk model is being implemented in practice. If significant differences are found between current practices and existing

literature, recommendations will be proposed to address these differences. This study should also benefit auditors by providing benchmarks regarding the relative weights assigned to the various components of the audit risk model. By understanding their own risk assessments better, auditors could achieve higher consistency and consensus. Consensus is a necessary condition for the existence of professional expertise (Einhorn, 1974). Lack of consensus of audit opinions about financial statements could undermine the stature of the auditing profession. This study also could aid external auditors in lowering annual audit fees by clarifying the relationship between the extent of auditing procedures and the relative risk exposure of the specific audit situation. Clarifying this relationship could reduce the likelihood of either overauditing or underauditing, thus allowing audit resources to be utilized in a more efficient fashion.

1.2 A model of the audit process

In this section a model is discussed relating audit risk assessments to the overall audit process. This should aid in the discussion of research relevant to this study as well as the development of the research instruments. It is not the purpose of this section to build an all encompassing model of the audit process. Rather, the purpose is to show how the audit risk model fits into a model which is representative of a typical audit. Felix and Kinney's [1982] model of the auditor's opinion formulation process (as described in Figure 1.1) will be used.

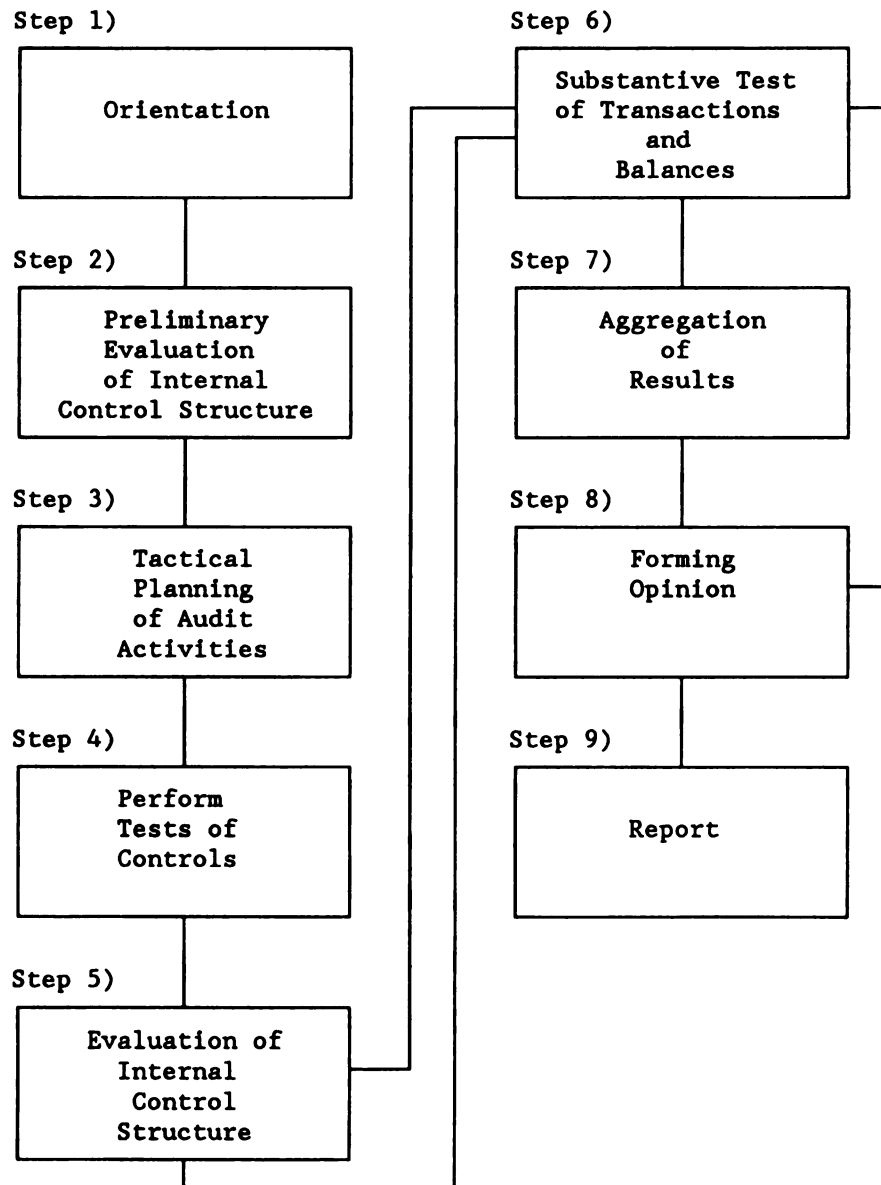


FIGURE 1.1
An Overview of the Auditor's Opinion Formulation Process

Step 1 is described by Felix and Kinney [1982] as the auditor gaining knowledge of the geographic, economic, and industrial setting of the client organization; the nature of the client's operations; the competence and ethics of managerial and financial personnel; and the nature and characteristics of the accounting and financial reporting systems of the client.

Step 2 involves a preliminary evaluation of the internal accounting controls. This evaluation is essentially an assessment of the error-generation propensities of the various components of the client's accounting system. Error-generation propensities are related to the auditor's assessment of the quality of the design of the internal accounting controls and the likely compliance of system operations with the design.

Step 3 entails designing a set of audit procedures that can be expected to collect sufficient, competent evidence to support an opinion on the financial statements at a minimum expected cost. This plan is preliminary since the actual engagement circumstances may deviate from expectations. This step involves evaluating the different types of tests of controls⁴ and substantive procedures available and then selecting the most effective and efficient mix of tests of controls and substantive procedures that will result in an acceptable audit opinion.

⁴ Felix and Kinney's [1982] model of the auditor's opinion formulation process was developed prior to SAS No. 55 [1988] and therefore does not use the current terminology. Felix and Kinney's [1982] discussion has been changed to reflect the current terminology.

Step 4 involves carrying out any planned tests of controls. The tests of controls are performed on those controls the auditor had determined would be relied upon in planning the substantive procedures (see step 3). Tests of controls are designed to test the application of internal controls. The purpose of tests of controls is to provide reasonable assurance that internal control procedures are in use and operating as planned. Should the auditor believe the client's internal control structure is strong reliance can be placed upon the controls thereby reducing the substantive procedures to be performed.

Step 5 entails identifying departures from and evaluating the effectiveness of prescribed internal control procedures intended to be relied upon. The preliminary audit plan is re-evaluated to consider whether the results of the tests of controls support the planned reliance and, if not, what evidence alternatives exist. After the completion of the re-evaluation activity, the auditor is ready to conduct substantive procedures. When the controls are not considered effective the substantive procedures would be expanded at this point or in the next phase.

Step 6 involves the execution of substantive procedures. Substantive procedures are tests designed to identify monetary errors in transactions and balances or errors that may exist in financial disclosures. If the substantive procedures indicate that material errors exist the auditor will have to re-evaluate the audit plan and expand audit procedures.

The above steps are conducted with respect to specific audit objectives associated with sets of related transactions and balances

known as transaction cycles. An example of a transaction cycle is the revenue cycle. Some typical accounts included in the revenue cycle are: sales, sales returns and allowances, bad debt expense, trade accounts receivable, notes receivable, and allowance for doubtful accounts. Each of steps 1 through 6 would be conducted for each transaction cycle in the accounting system.

Step 7 involves aggregating the evidence from all cycles. This aggregation process supports the formulation of the audit report opinion and is done subjectively by the auditor.

Step 8 entails expressing an opinion on the financial statements taken as a whole and is based on the subjective aggregation of the evidence. The opinion is selected from the alternatives outlined in the authoritative literature.

Step 9 involves issuing the appropriate report.

Felix and Kinney's [1982] model of the auditor's opinion formulation process was developed before SAS No. 47 [1983] and SAS No. 55 [1988] were written. The first three steps of the auditor's opinion formulation process will be modified slightly to incorporate SAS No. 47 [1983] and SAS No. 55 [1988].

1.3 Incorporation of the audit risk model

The audit risk model is incorporated into the first three steps of the auditor's opinion formulation process. The audit risk model will not be incorporated into the evaluation of results phase of the auditor's opinion formulation process. The audit risk model is intended to be used as an aid to audit planning. Using the audit risk

model as an evaluation tool may result in more risk than indicated by the model⁵. Thus, the current research effort will only be concerned with the first three steps of the auditor's opinion formulation process.

It will be helpful to provide a brief discussion of the auditor's assessment of control risk before revising the auditor's opinion formulation process. SAS No. 55 [1988] outlines two steps related to the evaluation of the internal control structure. First, the auditor obtains a sufficient understanding of the internal control structure to plan the audit engagement. After obtaining this understanding, the auditor may either assess control risk at the maximum level⁶ or perform additional tests of controls to support a lower level of control risk. Consistent with the above discussion the auditor's opinion formulation process will be modified as follows.

In step 1 the auditor assesses inherent risk by evaluating such factors as the client's industry, client's profitability, and client's legal responsibilities and obligations.

In step 2 the auditor obtains a sufficient understanding of the internal control structure to plan the audit engagement and make a preliminary assessment of control risk.

In step 3 the auditor designs a set of audit procedures that will result in the desired level of audit risk. This involves evaluating

⁵ See Kinney [1983] and Cushing and Loebbecke [1983] for a detailed discussion of this issue.

⁶ SAS No. 55 [1988] defines control risk assessed at the maximum level as the greatest probability that a material misstatement which could occur will not be prevented or detected on a timely basis by the entity's internal control structure.

the various types of audit procedures (tests of controls and substantive procedures) with respect to control risk and detection risk and selecting the combination of audit procedures that will minimize expected costs at the desired (or acceptable) level of audit risk. Basically the auditor makes an assessment of the audit risk for each possible combination of audit procedures and selects that combination which has the lowest expected cost at the desired (or acceptable) level of audit risk. Audit risk is determined for each combination of audit procedures by incorporating the assessments of inherent risk and control risk with the auditor's assessment of detection risk.

As indicated above, these steps are conducted with respect to specific audit objectives associated with sets of related transactions and balances (e.g. revenue cycle). Each step is conducted for each transaction cycle in the accounting system.

The objective of sections 1.2 and 1.3 was to develop an understanding of the role of audit risk in the planning process and to illustrate the risk assessments made therein. The model of the audit process presents a framework in which the auditor's behavior as a decision maker can be examined. This model of the audit process will aid in the discussion of research relevant to the current study as well as the development of the research instruments.

1.4 Summary and organization of the current study

This chapter included a review of the general activities involved in planning and the structure of the audit process. This discussion suggests that risk assessments are an integral part of the audit

process. Risk assessments made during the planning phase bear on the amount and timing of audit procedures to be performed. This chapter also included a discussion of the authoritative pronouncements about audit risk, SAS No. 39 [1981] and SAS No. 47 [1983]. Finally, this chapter developed the questions which were addressed by the current research effort.

There are five chapters that follow. Chapter II examines research relevant to the current study. Chapter III discusses the hypotheses tested and the expected results based on prior research. Chapter IV discusses the methodology used for the current study. Included in this section is a detailed description of the development and administration of the research instruments as well as the experiments conducted. Chapter V describes the analysis performed and results of the analysis for each research question. The final chapter summarizes the findings and implications of the current study, discusses the contributions and limitations of the current study and gives suggestions for future research.

CHAPTER II

LITERATURE REVIEW

2. Overview

The auditor's assessment of the elements of audit risk, beyond internal control, is a relatively unexplored area in the field of auditing. The following literature review considers the audit risk model and the components of the audit risk model. This review may be classified into four major categories: 2.1) audit risk and the audit risk model, 2.2) inherent risk and the evaluation of situational factors, 2.3) internal control risk and the evaluation of internal controls, and 2.4) detection risk. The following four sections of the paper review research studies in these four areas for the purpose of providing guidance for, and comparisons with, the current research effort.

2.1 Audit risk and the audit risk model

This section explores research dealing explicitly with the audit risk model. The research discussed in this section can be characterized as one of two types: 2.1.1) analytical studies which critically evaluated characteristics of the audit risk model and 2.1.2) empirical studies which examined the integration of the components of the audit risk model.

2.1.1 Analytical Studies

Cushing & Loebbecke [1983] performed a normative study which critically evaluated the audit risk model in SAS No. 39 [1981] (see

equation 2, Chapter I, page 4). Some of the major criticisms noted by the authors are summarized below:

- The audit opinion is on the financial statements as a whole, but the risk factors of the model are computed at a disaggregated level. A theoretical basis for an aggregation of the model is unknown.
- The audit risk model is a joint probability model which assumes the risk factors are independent of each other. In reality, this may not always be the case.
- The values of the risk factors are subjectively determined by the auditor. To the extent that the auditor's estimates are wrong, the real value of overall audit risk will differ from its computed value.
- The use of the audit risk model as an evaluation tool is inappropriate. The audit risk model is intended to be a planning tool.

Overall the authors noted that the model is a simplified abstraction of reality, but it can be useful as a planning tool.

Cushing and Loebbecke [1983] normatively evaluated the audit risk model, they did not empirically test implications of the audit risk model. The current study empirically tested implications of the audit risk model. The guidelines and criticisms specified by the authors were incorporated into the current study as follows: First, the authors suggest that the risk components should be assessed at the lowest level in the accounting process which links each of the model's components. SAS No. 39 [1981] and SAS No. 47 [1983] are unclear as to what the appropriate level of aggregation is for the assessment of audit risk. The current study will investigate the assessment of audit risk with respect to a specific account and with respect to a specific audit objective within an account to determine the effect of the aggregation level on auditor's judgments. Second, the authors indicate

that it is difficult to measure inherent risk independently of control risk. Because of the dependencies between these two components this research effort will combine the assessment of inherent risk and control risk. The current study did not require auditors to make separate assessments of inherent and control risk. Third, the authors indicate that the actual value of audit risk will be wrong to the extent that the auditor's subjective assessment of audit risk is wrong. The current study examined the accuracy of the auditors risk assessments using consensus as a measure of accuracy. Finally, the authors suggest that there are problems with using the audit risk model as an evaluation tool. The current study was concerned with using the audit risk model as a planning tool only.

In another normative study evaluating the appropriateness of using the audit risk model advanced by SAS No. 39 [1981], Kinney [1983] noted a weakness in using the model to conditionally revise the audit plan or evaluate audit results (see equation 2, Chapter I, page 4). The author shows examples where the auditor may subject himself/herself to a greater(lessor) degree of ultimate risk than indicated by the audit risk model. Overall the author notes that while the audit risk model can be useful as a simplified audit planning tool it is inappropriate to use as an evaluation tool. Kinney [1983] normatively evaluated the audit risk model he did not empirically test implications of the audit risk model. The current study empirically tested implications of the audit risk model. Consistent with the authors criticism of using the audit risk model as a evaluation tool, the

current study was concerned with using the audit risk model as a planning tool only.

The primary focus of the two previous papers was to critically evaluate the audit risk model, it was not concerned with the current state of practice for assessing audit risk. The focus of the current research effort was to obtain a better understanding of audit risk assessments made by practitioners. The guidelines specified by the above papers were used as a starting point to describe the current state of practice for assessing audit risk.

2.1.2 Empirical Studies

Jiambalvo and Waller [1984], using the framework of the audit risk model in SAS No. 39 [1981], conducted an empirical study which investigated the effects of decomposition on auditors' assessments of the allowable detection risk (see equation 2, Chapter I, page 4). Decomposition in this context, referred to the auditors explicitly considering internal control risk (IC), analytical review risk (ARR) and ultimate risk (UR) before making their assessment of tests of details risk (TDR). Thirteen auditors from one "Big-8" public accounting firm were randomly assigned to one of two experimental groups. The subjects were asked to complete a questionnaire consisting of four cases. The subjects assigned to the first group were asked to respond to a single question that elicited a holistic assessment of TDR. Subjects in this group were not required to make explicit assessments of IC, ARR and UR before making their assessment of TDR. The subjects assigned to the second group were first asked to make

assessments of IC, ARR and UR and then asked to make an assessment of TDR. The results indicated that there was not a significant difference between the judgments made by the holistic and decomposition groups. An additional finding of the study was that auditors' intuitive combination of the risk components did not correspond closely with the combination dictated by the audit risk model. Auditors did not combine IC, ARR and UR in a multiplicative fashion. The authors advocated more behavioral research on how auditors assess audit risk.

The above study indicated that auditors do not follow the multiplicative composition rule suggested by the authoritative literature. Auditors were required to make risk assessments with respect to a specific account. The previous chapter developed the argument that risk assessments should be made with respect to specific audit objectives within accounts, not with respect to specific accounts. The conflicting results could have occurred because of the judgment task employed. The current study employed two different judgment tasks to determine the effect of the judgment task on auditor risk assessments. One task required auditors to make audit risk assessments with respect to a specific account. The other task required auditors to make audit risk assessments with respect to a specific audit objective within an account.

Daniel [1988] performed an empirical study which examined the composition rules followed by auditors with respect to the assessment of audit risk. Questionnaires were distributed to thirty three audit managers from nine of the ten largest accounting firms in Oklahoma City. The questionnaire asked the auditors to provide risk assessments

of inherent risk, control risk, analytical review risk, tests of details risk and audit risk for accounts receivable using both a five point Likert type scale and as a percentage probability. The assessments were made with respect to a referent client selected by the respondent. The auditors' assessments of the four risk components were mathematically combined using the three models outlined in SAS No. 39 [1981], SAS No. 47 [1983] and the Canadian Institute of Chartered Accountants (CICA) 1980 audit guide, "Extent of Audit Testing". The three computed values of audit risk were compared with the subjective audit risk assessments provided by the auditors. The results indicated that auditors do not combine the risk components in the multiplicative fashion suggested by any of the three models.

Similar to the previous study Daniel [1988] required auditors to make risk assessments with respect to a specific account. Different results could have occurred if a different judgment task had been employed. The current study employed two different judgment tasks to determine the effect of the judgment task on auditor risk assessments.

Libby, Artman and Willingham [1985] performed a study which investigated whether auditors combine process susceptibility (inherent risk), internal control design strength, and compliance test strength in a multiplicative fashion. The latter two are components of control risk. Sixteen cases were generated by systematically varying the control risk characteristics. Blocks of eight cases were selected from the sixteen cases and presented to fourteen auditors from one "Big-8" public accounting firm, a 4^2 factorial design confounded in blocks of eight units. The fourteen auditors were asked to determine the degree

of reliance to be placed on the controls relating to accounts payable. The results indicated that the auditors' decisions were consistent with the multiplicative nature of the audit risk model for control risk and inherent risk. The results also indicated a high level of consensus (.68) among auditors. Consensus was measured by computing the mean of all pairwise correlations among auditors' assessments.

Unlike the previous two studies, the above study found auditors were following a multiplicative composition rule. The conflicting results of these studies support the notion that the judgment task does affect auditor risk assessments. Libby et al. [1985] required auditors to make evaluations at a processing stream level (i.e. the processing of specific accounting documents/transactions) while the other two studies required auditors to make risk assessments at an account level. Two different judgment tasks were employed by the current study to determine the effect of the judgment task on auditor risk assessments.

The current study also examined the effect of the judgment task on the level of agreement across auditors. Libby et al. [1985] found agreement across auditors to be relatively high. The judgment task employed by Libby et al. [1985] does not agree with the judgment task developed in Chapter I. The discussion in the previous chapter argued that risk assessments are made with respect to specific audit objectives within accounts not with respect to specific processing streams. Requiring auditors to make assessments outside the normal judgment task could reduce the overall level of agreement among auditors. The level of agreement found by Libby et al. [1985] may have been enhanced by the use of auditors from one "Big-8" accounting firm.

The current study examined the effect of the judgment task on the level of agreement across auditors.

Libby et al. [1985] found that auditors follow a multiplicative composition rule for inherent risk and control risk. The current study extended Libby et al.'s [1985] study by examining the composition rule followed by auditors for expectations of errors, analytical review risk and tests of details risk.

Kaplan [1985] conducted an empirical study which investigated the effects of firm environmental characteristics, firm internal control effectiveness, and elicitation of internal control effectiveness on planned audit hours for an accounts receivable subsystem. Eighteen cases were generated by varying environmental characteristics, internal control characteristics and elicitation of internal control effectiveness, a (3 x 3 x 2) mixed factorial design. The subjects consisted of eighty four auditors from one large national accounting firm. The auditors were asked to indicate planned audit hours for each of five audit procedures. The planned extent of audit hours for each audit procedure was totaled for each case and auditor. Consistent with the audit risk model, the results indicated that the firm environmental factor had an interaction effect with the internal control factor. The environmental manipulation can be thought of as an inherent risk factor while the internal control manipulation can be thought of as a control risk factor. This interactive effect suggests that auditors are combining inherent risk and control risk in a multiplicative fashion. Another finding of the study was that the method of internal control evaluation did affect the results. The method of internal control

evaluation was manipulated by requiring participants to either evaluate or not evaluate the internal control system before indicating planned amount of audit hours.

The task required by the above study differed from the three previous studies. Auditors were required to determine planned audit hours for five substantive procedures in an accounts receivable subsystem. The auditors were not required to make risk assessments. Although the above study did not directly examine the assessment of audit risk it does suggest that auditors combine components of the audit risk model in a multiplicative fashion. Furthermore, the study reveals that minor changes in the judgment task can significantly affect auditor judgments. Similar to the previous studies the task required of the participants did not conform to the audit process developed in Chapter I. Decisions about substantive procedures are not directly based upon particular environmental characteristics or internal control procedures, but upon the degree to which these factors affect audit objectives. In addition to examining the effect of the judgment task on auditor decisions, the current study also examined the composition rule followed by auditors for expectations of errors, analytical review risk and tests of details risk. Kaplan's [1985] study examined the composition rule followed by auditors for inherent risk and control risk only.

Strawser [1985] performed a study which investigated whether auditors utilize the components of the audit risk model suggested by SAS No. 39 [1981] and 47 [1983]. Twenty four cases were generated by varying the risk levels for each component of the audit risk model as

well as some other situational factors, a (3 x 2 x 2 x 2) completely crossed factorial design. Forty eight auditors from local and regional CPA firms were asked to evaluate the series of cases based on 1) the perceived level of audit risk and 2) the estimated number of man hours required to complete the audit engagement. The results were analyzed using ANOVA techniques. The results indicated that 1) auditors consider the components of the audit risk model when assessing audit risk and 2) auditors exhibited a moderate level of consensus (.45).

The author did not examine the composition rule followed by auditors. Furthermore, the auditors were required to make their assessments outside the normal judgment task. The auditors were asked to make risk assessments with respect to the overall payroll account, not with respect to specific audit objectives within the payroll account. Requiring auditors to make their assessments outside the normal judgment task could reduce the overall level of agreement among auditors. The current study examined the composition rule followed by auditors as well as the effect of the judgment task on the level of agreement among auditors.

In summary, the previous studies examined such issues as the composition rules followed by auditors and the level of agreement among auditors. Contradictory results were obtained with respect to the composition rules followed by auditors. Jiambalvo and Waller's [1984] study and Daniel's [1988] study suggest that auditors are not combining the components of the audit risk model in a multiplicative fashion. Libby, et al.'s [1985] study and Kaplan's [1985] study suggest that

auditors are combining control risk and inherent risk in a multiplicative fashion.

One possible explanation for the conflicting results is the level at which auditors were required to make their risk assessments. Jiambalvo and Waller [1984] and Daniel [1988] required auditors to make their risk assessments at an account level. Libby et al. [1985] required auditors to make their evaluation at a processing stream level. The Kaplan [1985] study is not directly comparable to the other studies as auditors were not required to make risk assessments, rather they were required to determine planned audit hours for an accounts receivable subsystem. The discussion of the audit process in the previous chapter developed the argument that risk assessments are made with respect to specific audit objectives associated with sets of related transactions and balances. To address these previous research differences the current study examined the assessment of audit risk at two levels of aggregation to determine what effect, if any, the judgment task has on the composition rules followed by auditors. The current study also examined the effect of the judgment task on the level of agreement across auditors. Neither Libby et al. [1985] nor Strawser [1985] used the judgment task developed in the previous chapter. Using a judgment task which is more representative of an actual audit engagement could increase agreement among auditors.

2.2 Inherent risk and the evaluation of situational factors

Inherent risk is the susceptibility of an account balance or class of transactions to error that could be material assuming that

there were no related internal accounting controls. Inherent risk factors are potential sources of errors and misstatements which are: 1) outside the client's environment, 2) beyond the client's control, and/or 3) not addressed by the client's existing system (Strawser, 1985). Inherent risk factors exist independent of the external audit. The discussion in the previous chapter noted that it is difficult to assess inherent risk independently of control risk. For this reason, the current study combined the assessment of inherent risk and control risk to form a general environment factor called "expectations of errors." This subsection of the paper reviews research which has been conducted relevant to the assessment of inherent risk. The objective of this review is to help in operationalizing expectations of errors.

The auditor's assessment of inherent risk is a relatively unexplored area in the field of auditing as few professional or academic researchers have addressed this subject until recently. Although the research cited in this subsection may not explicitly consider inherent risk, it does provide some valuable information as to the type of factors which do affect inherent risk. Research relevant to inherent risk can be characterized as one of two types: 2.2.1) empirical studies concerned with determining what inherent risk factors auditors consider most important when evaluating a client and 2.2.2) empirical studies examining whether or not particular inherent risk factors influence auditor decisions.

2.2.1 Determination of Importance of Inherent Risk Factors

Brewer [1981] performed a research study to determine what factors should be considered in assessing the inherent riskiness of an audit environment, excluding internal controls. The study was conducted in two stages. In the first phase, 191 auditors from nine national accounting firms were used to identify factors other than internal control which auditors associate with audit risk. Questionnaires were sent to the auditors asking them to indicate, using a five point Likert scale, the audit risk associated with several audit risk items. Factor analysis was used to group the factors into a smaller, more manageable number.

In the second phase, an experiment was performed to determine whether auditors increase audit intensity in response to the presence of these audit risk factors. Audit intensity was defined as a combination of one or more of the following factors: 1) quantity of evidence gathered, 2) timing of audit work, 3) quality of audit work performed, and 4) quality of evidence gathered. Three cases were generated by manipulating the presence/absence of two of the audit risk factors (a threat to client survival and incapable client management). One hundred sixteen auditors from eight national accounting firms were used in the experiment. Each auditor received one of the three cases and was asked to indicate, using a four point Likert type scale, the audit intensity required. The results were analyzed using ANOVA techniques. The major findings of the study were that 1) many other risk factors exist besides those related to internal control and 2) as risk

increases, there is a change in audit intensity for one or more major audit areas.

Brewer's [1981] study required auditors to evaluate the importance of risk factors with respect to the overall financial statements. The previous discussion of the auditing process developed the argument that inherent risk is evaluated with respect to specific audit objectives within an account not with respect to the overall financial statements. The inherent risk factors considered important by an auditor with respect to a specific audit objective may not agree with the factors considered important with respect to the overall financial statements. The current study investigated the evaluation of audit risk factors with respect to a specific account and a specific audit objective within an account. Assessments were made at two different levels of aggregation to determine the effect of the judgment task on the importance of inherent/control risk factors. The risk factors examined by Brewer [1981] were helpful in developing the current research instrument.

Gibbons and Wolf [1982] surveyed eighty accountants employed by six national public accounting firms in Canada to determine which components of the audit environment influence audits the most. The results from their questionnaire identified many factors that were considered average to above average predictors of problems in an audit. In addition, there were other factors identified that were considered strongly related to predictors of audit problems, although each was not considered a strong predictor of problems in itself.

Similar to the previous study, Gibbons and Wolf [1982] required auditors to make their assessments at a general aggregated level. Auditors were required to indicate the influence of environmental factors on the overall audit engagement. Auditors did not evaluate the environmental factors with respect to specific audit objectives within an account. Although Gibbons and Wolf's [1982] study did not explicitly consider inherent risk, it does provide some valuable information as to the type of factors which do affect inherent risk. The environmental factors identified by the authors were useful in developing the research instrument used by the current study.

In summary, the two previous studies surveyed auditors to determine the importance of various risk factors. These studies required auditors to evaluate the importance of risk factors at a general aggregated level. Brewer [1981] required auditors to evaluate the importance of risk factors with respect to the overall financial statements while, Gibbons and Wolf [1982] required auditors to evaluate environmental factors with respect to the overall audit engagement. The evaluation level used by these studies does not conform to the description of the audit process developed in Chapter I. The previous discussion of the auditing process argued that inherent/control risk factors should be evaluated with respect to specific audit objectives associated with sets of related transactions. What factors an auditor considers important at one level of aggregation may be different than those factors considered important at another level of aggregation. The risk factors indicated by these studies were used to develop the current research instrument. The current research effort looked at the

evaluation of audit risk factors at two levels of aggregation to determine the effect, if any, the aggregation level has on the evaluation of inherent/control risk factors.

2.2.2 Influence of Inherent Risk Factors on Auditor Decisions

Riley [1987] performed a study which developed and tested an analytical audit technique to evaluate inherent/control risk. The study was concerned with whether or not the analytical audit technique could improve auditors' assessments of inherent/control risk. Five auditors, from one "Big-8" public accounting firm, were used to develop the analytical audit technique used in this study. These auditors were asked to make pairwise comparisons between risk factors indicating which factor they considered more important in mitigating inherent/control risk exposure. The inherent/control risk factors considered were divided into eight categories:

- Inherent risk
 - General,
 - Industry and Market,
 - Financial, and
 - Other
- Control risk
 - Authorization controls,
 - Accuracy and Completeness controls,
 - Separation of Duties/Custodial Responsibility controls, and
 - Substantiation and Evaluation controls

The analytical audit technique to evaluate inherent/control risk facts was developed using the analytical hierarchical framework. The main thrust of the study was to evaluate the analytical audit technique developed. Thirty six auditors, from one "Big-8" public accounting firm, and twenty nine students were used to test the analytical audit

technique. Approximately half of the auditor and student participants were given five cases and asked to evaluate inherent/control risk using the analytical audit technique developed. The other half of the auditor/student participants were asked to evaluate the inherent/control risk of the five cases using a more traditional approach. The five cases were developed by varying both quantitatively and qualitatively the inherent/control risk factors. The results indicated that auditors/students using the analytical audit technique had higher agreement in their inherent/control risk assessments than auditors/students using the traditional approach. Additionally, the results indicated that the students assessments of inherent/control risk were more consistent with the auditors assessments when using the analytical audit technique.

The primary focus of Riley's [1987] study was to develop and test an analytical audit technique. The author was not concerned with the composition rule followed by auditors. Moreover, the judgment task employed by the author diverged from the one developed in Chapter I. Riley [1987] required auditors to make their risk assessments with respect to the revenue cycle. The discussion in the previous chapter argued that risk assessments should be made with respect to specific audit objectives within accounts. In addition to examining the composition rule followed by auditors, the current study examined the effect of the judgment task on the auditor's decisions. The inherent/control risk factors identified by the Riley [1987] were helpful in developing the instrument employed for the current study.

Kaplan and Reckers [1984] conducted a study which examined the effects of management integrity, management control consciousness, auditors' prior beliefs, and auditor level on judgments of the likelihood of a material error occurring in accounts receivable. In this study, sixty auditors from eight national accounting firms were asked to make a preliminary assessment of the likelihood of a material error occurring in accounts receivable. The auditors were asked to make this assessment based on evidence consisting of background information and high and low levels of management integrity and control consciousness. After making the preliminary assessment the auditors were provided with additional information consisting of a completed internal control questionnaire and supplementary materials. The auditors were then requested to make an assessment similar to the preliminary assessment. The results were analyzed using ANOCOVA techniques with the auditors' prior beliefs being treated as a covariate. The results indicated that the auditors' prior beliefs were significant in both the preliminary and subsequent assessments. The authors also found that management control consciousness was significant for audit seniors' preliminary assessment, while management integrity did not exert a significant influence on either the preliminary or subsequent assessment.

The authors were concerned with the effect of management integrity, management control consciousness, auditors' prior beliefs, and auditor level on auditor decisions. They did not examine the composition rule followed by auditors. This study, like the previous study, required auditors to make risk assessments outside the normal

judgment task. Kaplan and Reckers [1984] required auditors to make risk assessments with respect to accounts receivable. The discussion in the previous chapter argued that risk assessments should be made with respect to specific audit objectives within accounts. The current study examined both the composition rule followed by auditors and the effect of the judgment task on auditor decisions.

Kaplan and Reckers's [1984] results indicated that auditors' risk assessments were affected by the level of auditor making the assessment. This finding highlights the care that must be exercised towards selecting the appropriate level of auditor to perform the risk assessments. Discussions with practicing auditors and prior research suggests that audit managers are primarily responsible for making risk assessments of the type required by the current study. For this reason, audit managers were requested by the researcher to perform the risk assessments.

In summary, the two previous studies examined the effect of inherent/control risk factors on auditor decisions. The judgment task employed by these studies does not conform to the judgment task developed in Chapter I. Riley [1987] required auditors to make risk assessments with respect to the revenue cycle while Kaplan and Reckers [1984] require auditors to make risk assessments with respect to accounts receivable. The discussion of the audit process in the previous chapter argued that inherent risk assessments should be made with respect to specific audit objectives associated with sets of related transactions and balances. The factors used to manipulate inherent risk may be important at one level of audit judgment but not

at another level of audit judgment. The current study examined the assessment of audit risk using two different judgment tasks to determine the effect, if any, of the judgment task on risk assessments. The studies analyzed in this subsection were useful in operationalizing inherent/control risk for the current research effort.

2.3 Internal control risk and the evaluation of internal controls

Control risk is the risk that an error that could be material will not be prevented or detected by the system of internal accounting controls. A large amount of research has been conducted concerning auditor assessments of internal control and audit planning decisions based on these assessments. In this subsection we explore research that has been conducted which is relevant to the assessment of control risk. Although the research cited may not explicitly consider control risk, it does provide valuable information as to the type of factors which do affect control risk.

Two steps were outlined in Chapter I related to the assessment of control risk. First, the auditor obtains a sufficient understanding of the internal control structure to plan the audit engagement. After obtaining this understanding, the auditor may either assess control risk at the maximum level or perform additional tests of controls to support a lower level of control risk. Consistent with the above discussion the assessment of control risk can be written as a function of two separate risks: 1) the risk that the internal control structure fails to detect a material error and 2) the risk that the auditor's tests of controls fail to detect material weaknesses in the control

structure⁷. The exact functional form of this relationship has not been specified in the literature. In general terms this relationship can be modeled as follows:

$$CR = f(CSR, CTR) \quad (5)$$

Where: CR = control risk.
 CSR = control structure risk.
 CTR = control test risk.

This section of the literature review will be organized around these two components of control risk.

2.3.1 Control Structure Risk

Research relevant to this section can be characterized as one of two types: 2.3.1.1) empirical studies determining factors auditors consider important when evaluating control structure and 2.3.1.2) empirical studies examining auditor judgment with respect to control structure.

2.3.1.1 Factors auditors considered important when evaluating control structure

Haskins [1987] conducted a study which investigated 1) auditors' perceptions of the importance of various control risk factors, 2) contextual factors which condition the importance of control risk factors, and 3) which audit team member is responsible for evaluating various

⁷ Libby et al. [1985] defined control risk as a function of three separate components: 1) control design strength, 2) control test strength and 3) control test results. This study is concerned with the assessment of audit risk in the planning phase. Thus, control test results is excluded from the definition of control risk.

control risk factors. Some examples of contextual factors were firm affiliation, firm specialization and auditor rank. Questionnaires were distributed to auditors from "Big-8" public accounting firms. The questionnaire identified a referent client for each respondent and asked the respondent to indicate, using a five point Likert type scale, how much influence each of forty eight control risk factors should have on the client's control environment. Additional information was collected on the audit team member who should have responsibility for assessing the particular control risk factor and respondent demographics. The forty eight control risk factors were identified through discussions with "Big-8" personnel and pertinent "Big-8" in-house literature.

Some findings of the study were that 1) client contextual variables such as client size and complexity were associated with control risk factors, 2) auditor's firm affiliation and office specialization were associated control risk factors, 3) auditor's experience level was associated with control risk factors, 4) either the manager or senior should have primary responsibility for evaluating the control risk factors and 5) auditors attached a low level of importance to personnel related factors such as client training.

Studies conducted by Hylas and Ashton [1982] and Kreutzfeldt and Wallace [1986] found personnel problems to be one of the primary causes of errors. Yet, Haskins [1987] found personnel factors to have low importance ratings. One possible explanation of the low importance ratings given to personnel factors is the judgment task employed by the author. The author required auditors to evaluate risk factors with

respect to a referent client. The discussion of the auditing process in the previous chapter argued that risk factors should be evaluated with respect to specific audit objectives within accounts. The low importance ratings attached to personnel factors may be an indication that while these factors are potentially important for some level of audit judgement, they are not important at the level in which the auditors were required to make their assessments. The current research project will look at the assessment of audit risk factors at two levels of aggregation to determine the effect, if any, the aggregation level has on audit judgments. One task required auditors to make their audit risk assessments with respect to a specific account. The other task required auditors to make their audit risk assessments with respect to a specific audit objective within an account. Haskins' [1987] study will be useful in operationalizing inherent/control risk for the current research effort.

Haskins' [1987] results indicated that importance ratings were affected by auditor level. This finding suggests that researchers must be careful to select participants who are involved with the task under examination. The results indicated that the first level of auditor which is involved with all phases of risk assessments is that of audit manager. Discussions with practicing auditors also indicate that the appropriate level of participant for tasks of the nature examined by the current study is that of audit manager. For this reason, audit managers were requested by the researcher to perform the risk assessments.

2.3.1.2 Auditor judgment with respect to control structure

The characteristics of a sound internal control system are well known and documented in the auditing literature. Several studies have looked at auditors' assessments of internal control systems and audit plan decisions. Ashton [1974] using ANOVA techniques investigated the degree of agreement in the auditors' judgments of internal control system effectiveness and audit plan decisions, and also investigated the auditors' decision models for similarities in structure and weights assigned to the internal control characteristics utilized. Sixty three auditors were asked to evaluate the strength of a payroll internal control system using a six point Likert type scale (ranging from extremely weak to adequate to strong). The auditors were asked to evaluate the subsystem based on evidence consisting of case background information and a six item questionnaire. Thirty two cases were generated by systematically varying the "yes" or "no" answer to each questionnaire item, a one-half replication of a 2^6 factorial design. A linear equation was formulated for each auditor to represent the auditors' decision model, based upon his/her judgments for the 32 different cases. The experiment was repeated after a lapse of six to 13 weeks. Ashton [1974] found that the auditors exhibited a relatively high level of consensus (.70) and stability (.81). Consensus was measured by computing the mean of all pairwise correlations among the auditors' judgments. Considerable variability was seen among the auditors about the importance of the characteristics. Of the set of characteristics presented, each characteristic was considered most important (highly weighted) by at least one auditor, and each

characteristic was considered least important by at least one auditor. However, the two characteristics regarding separation of duties accounted for most of the explained variance in auditors' responses (51.4%). Considerable variability was also seen in the assignment of subjective weights. Mild support was found for audit experience and firm affiliation affecting auditor judgments.

Ashton [1974] required auditors to evaluate the strength of the overall internal control system. The discussion of the auditing process in the previous chapter developed the argument that internal controls (control risk) should be evaluated with respect to the degree specific audit objectives are achieved. Whether the consensus results can be generalized to a different judgment task is an open empirical question. To address this empirical question the current study examined the effect of the judgment task on the level of agreement among auditors. One task required auditors to make their audit assessments with respect to a specific account. The other task required auditors to make their audit assessments with respect to a specific audit objective within an account. Control risk factors identified by the author were helpful in the development of the current study instrument.

Ashton's [1974] study was extended by Hamilton and Wright [1982] to explicitly consider the relationship between years of experience and judgment consensus, stability of judgments, and relative weighting of control characteristics. Hamilton and Wright [1982] modified Ashton's [1974] case materials slightly and changed the payroll internal control characteristics presented to the subjects. Two of the characteristics

from Ashton's [1974] study were dropped, while two items dealing with separation of duties were split into three. Thirty two cases were generated by systematically varying the internal control characteristics to represent a completely crossed factorial design (2^5). Seventy eight auditors evaluated the cases using Ashton's [1974] six point Likert type scale. The auditors had a much broader range of experience than Ashton's [1974] study. Hamilton and Wright [1982] analyzed the results using ANOVA techniques and achieved results similar to Ashton's [1974] study. A high level of overall consensus was found with the mean consensus of the firms ranging from .69 to .77. Highly significant interfirm differences for consensus were noted. There were no differences due to the experience level in either degree of consensus or predictability. However, the higher experience levels were correlated positively with greater judgment insight. Separation of duties cues again accounted for most of the variance in the auditors' responses (75.4%).

Similar to the previous study, this study required auditors to evaluate the strength of the overall internal control system. The discussion of the audit process in the previous chapter argued that internal controls (control risk) should be evaluated with respect to specific audit objectives. The generalizability of the consensus results to the auditors normal judgment task is an open empirical question. The current study addressed this empirical question by examining consensus among auditors across two different judgment tasks. Control risk factors identified by the authors were helpful in the development of the current study instrument.

A modified version of Ashton's [1974] experimental instrument was used by Ashton and Brown [1980] in another replication. Two additional questionnaire items, one dealing with rotation of duties and another dealing with background inquiries for new employees, were added. One hundred twenty eight cases representing a fractional factorial design and 32 repeat cases were evaluated by 31 auditors. The results were analyzed using ANOVA techniques. Results of the study were very similar to Ashton's [1974] study. A moderate level of consensus (.67) was seen. The cues related to separation of duties accounted for 50.9% of the variance explained, while the rotation of duties cue was not emphasized.

This study, like the previous studies, required auditors to evaluate the strength of the overall internal control system. The judgment task employed by the authors abstracted significantly from the judgment task developed in the previous chapter. The effect of the judgment task on the level of consensus among auditors is an open empirical question. The current study addressed this empirical question by examining consensus among auditors across two different judgment tasks. Control risk factors identified by the authors were helpful in the development of the current study instrument.

Each of the studies discussed in this section so far required auditors to make assessments about the strength of internal control systems. The studies did not relate internal control assessments to the extent of substantive tests to be performed. The second standard of field work not only requires an evaluation of the internal control structure, but also relating the extent of substantive tests to this

evaluation. The relationship of extent of audit tests to changes in internal control systems and the degree of agreement among auditors in audit planning was investigated by the next researcher considered in this literature review.

Joyce [1976] extended Ashton's [1974] study by investigating judgment consistency in decisions of the extent of substantive tests devised for different internal control situations. Joyce [1976] used a design similar to Ashton's [1974] 2⁶ ANOVA design for an accounts receivable subsystem. Thirty five auditors responded to each case by indicating the planned amount of time spent on each of five audit procedures. The planned extent of audit hours for each case was totaled for each auditor and paired correlations of the time for the first 16 cases were determined. The mean correlation was .37 with a range of .94 to -.69. In the analysis of the decision models for each individual, Joyce [1976] found a significant amount of variability in the importance auditors attach to various cues by the auditors. Similar to Ashton's [1974] study, separation of duties accounted for most of the explained variance in auditor responses (28.1%).

Similar to the previous studies the task required of the participants did not conform to the audit process developed in Chapter I. Decisions about substantive procedures are not directly based upon particular internal control procedures, but rather upon the degree to which internal control procedures affect audit objectives. The generalizability of the consensus results to a more representative judgment task is an open empirical question. The current study addressed this empirical question by examining consensus among auditors

across two different judgment tasks. Control risk factors identified by the authors were helpful in the development of the current study instrument.

In summary, the research studies reviewed in this subsection support the conclusion that auditors differentially weight internal control system characteristics. The results were consistent across firms, auditors, experience levels, and slightly modified tasks. However, the relationship of audit evidence to subsequent audit decisions envisioned in these studies does not conform to the audit process described in Chapter I. Assessment of overall system reliability and audit planning decisions about substantive test procedures are not directly based upon the particular internal controls but upon the degree to which possible errors and irregularities are controlled in a given situation. The relationship of particular internal controls and overall effectiveness of the system or subsequent decision may be more complex than envisioned in prior studies. Particular controls are important only insofar as they singly or in combination with other controls reduce the probability of specific errors and irregularities. To address the problems cited with the prior studies the current research effort employed a judgment task more representative of the audit process developed in the previous chapter. The control factors identified by these studies were useful in operationalizing inherent/control risk for the current research effort.

2.3.2 Control Test Risk

Control test risk is defined as the risk that the auditor's tests of controls fail to detect material weaknesses in the control structure. Control test risk is a function of the sufficiency and competence of tests of controls. Sufficiency refers to the quantity of evidence obtained. Competence refers to the relevance and quality of tests of controls. Not all tests of controls are of the same quality. A review of the relevant literature indicates that there are basically five different types of tests of controls:

- Examination of evidence (EE) - the auditor examines records and other documents for evidence, such as a clerk's initials, that a control procedure has been applied.
- Inquiry (IN) - the auditor discusses with auditee employees the control procedures they perform.
- Observation (OB) - the auditor observes auditee employees performing a control procedure.
- Repformance (RP) - the auditor repeats the same control procedures performed by auditee employees to determine if the document is correct with respect to the control procedure.
- Scanning (SC) - the auditor quickly reviews documents for obvious errors that relate to the control procedure.

Auditors are not always able to choose among the various tests of controls and may apply the audit procedures in combination or by themselves.

Very little empirical research has been conducted in the area of the auditors' perceptions of the strength of various tests of controls. The results of the study conducted by Libby, Artman and Willingham [1985], which was previously summarized, indicated that auditors place more reliance on detail tests of controls versus observation and

inquiry and that supplementing observations and inquiry with additional procedures leads to increased reliance. The tests of controls examined by Libby et al. [1985] were used as a starting point for the development of the current study instrument.

2.4 Detection risk

Detection risk is the risk that an auditor's procedures will lead him/her to conclude that an error that could be material does not exist when in fact such an error does exist. Detection risk relates to the effectiveness of auditing procedures.

This section explores research that has been conducted which is relevant to the assessment of detection risk. Studies relating to detection risk include research which: 1) addresses the effectiveness of accounts receivable confirmations, 2) addresses the effectiveness of audit sampling techniques, 3) addresses the effectiveness of analytical review procedures, and 4) addresses procedures used by auditors to discover errors. An example of the first type of research is Warren [1975]. An example of the second type of research is Duke et al. [1985]. Examples of the third type of research are Kinney and Uecker [1982] and Biggs & Wild [1985]. Examples of the fourth type of research are Hylas and Ashton [1982] and Kreutzfeldt and Wallace [1986]. No further discussion will follow for the first three types of research studies, since they do not aid in the development or analysis of the current research effort. A discussion will follow for the fourth type of research study. Although this research does not explicitly consider detection risk, it does provide some valuable

information as to the type of factors which do affect detection risk. Additionally, this research provides valuable information about the primary causes behind audit errors. This information gives an indication of what type of factors are useful for the assessment of inherent and control risk.

A review of the relevant literature indicates that there is basically three different types of substantive detection tests:

- Analytical tests (AT) - general tests made by a study of comparisons and relationships among data.
- Tests of transactions (TT) - the auditor examines transactions to determine whether they were correctly recorded and summarized.
- Direct tests of balances (DB) - the auditor obtains and verifies the details of ending balances in the general ledger.

The research studies cited below were primarily concerned with the relative effectiveness of the various substantive detection tests.

Hylas and Ashton [1982] conducted a study which examined the relative effectiveness of various audit procedures to detect errors across audit settings. One hundred fifty two auditors, from one "Big-8" public accounting firm, were asked to provide detailed information on 281 errors and resulting audit adjustments. Data was collected on 1) the amount and accounts affected, 2) procedure leading the auditor to identifying the error, and 3) cause of the error.

The results suggest that informal procedures such as analytical reviews and client discussions are fairly effective in detecting errors. The relative effectiveness of analytical review procedures may be overstated by this study. Informal procedures, such as analytical review procedures normally occur before much of the detailed test work

is performed. The detailed test work could have been just as effective, or even more effective than the analytical review procedures if they were performed first. Another finding of this study was that over one-third of all errors eventually discovered were the result of insufficient accounting knowledge and other types of accounting personnel problems. This finding suggests that the evaluation of client personnel should be an important consideration when assessing control risk.

The study conducted by Haskins [1987] indicated that personnel problems were not an important consideration during the assessment of control risk. This is a rather disturbing finding considering the results obtained by Hylas and Ashton [1982]. The authors found personnel related problems to be one of the primary causes of errors. One possible explanation for the conflicting results is the judgment task employed by Haskins [1987]. Haskins [1987] required auditors to make assessments with respect to a referent client. The discussion of the audit process in the previous chapter developed the argument that risk factors should be evaluated with respect to specific audit objectives within accounts. The current study employed two different judgment tasks to address the limitation of the Haskins [1987] study. This should allow a determination of the effect of the judgment task on audit assessments. One task required auditors to make their audit assessments with respect to a specific account. The other task required auditors to make their audit assessments with respect to a specific audit objective within an account. Risk factors identified by

Hylas and Ashton [1982] were helpful in the development of the current study instrument.

Kreutzfeldt and Wallace [1986] conducted a study which examined error characteristics and environmental factors across audit settings. Questionnaires were sent to auditors from one "Big-8" public accounting firm representing 260 audit engagements. The questionnaires solicited information on financial statement errors and environmental factors. Error information was collected regarding type, accounts affected, amounts, cause, method of discovery, and description.

Similar to Hylas and Ashton [1982], the results indicate that informal procedures are fairly effective in detecting errors. Also similar to Hylas and Ashton [1982] was the finding of this study that over one-third of all errors eventually discovered were the result of personnel problems. A review of the results related to environmental factors indicated that firms experiencing liquidity or profitability problems had more or larger errors.

Kreutzfeldt and Wallace [1986] give further support that personnel problems should be an important consideration for the assessment of control risk. The current study employed two different judgment tasks to determine if the results obtained by Haskins [1987] were an artifact of the judgment task employed. Risk factors identified by Kreutzfeldt and Wallace [1986] were helpful in the development of the current study instrument.

In summary, both the Hylas and Ashton [1982] and the Kreutzfeldt and Wallace [1986] studies indicate the personnel problems are one of the primary causes of error. Yet, the Haskins [1987] study notes that

auditors do not weight personnel problems very significantly when evaluating control risk. One possible explanation for these conflicting results is the level in which Haskins [1987] required auditors to make assessments. Haskins [1987] required auditors to make assessments with respect to a client not with respect to specific audit objectives associated with sets of related transactions and balances. To control for this problem, this research effort required auditors to make audit assessments at two levels of aggregation, audit objective level and account level. This enabled the researcher to determine the effect, if any, of the judgment task on audit assessments. The studies provide valuable information as to the type of factors which do affect detection risk and control risk for the current research effort. Risk factors identified by these studies were helpful in the development of the current research instrument.

2.5 Summary

This chapter reviewed research relevant to the assessment of audit risk. Included in the first section of this chapter was a review of research concerned with the integration of audit risk model components. Few inferences could be drawn from this research. Conflicting results were obtained by these studies. The conclusion derived from this review is that additional research is needed to examine the causes behind these conflicting results. The current study is a first attempt to address these conflicting results. The remaining sections of this chapter were primarily concerned with studies examining the importance or effects of risk factors on auditor decisions. These

studies indicate that auditors do consider risk factors, but in general, risk judgments have not been well explored. The next chapter discusses the hypotheses which will be tested by the current study.

CHAPTER III

HYPOTHESES

3. Overview of Hypotheses

The purpose of this chapter is to discuss the hypotheses tested by the two interrelated experiments. This discussion will be organized around two areas of interest. The first section will discuss hypotheses regarding the integration of the components of the audit risk model. The second section will discuss hypotheses regarding the judgment task required of auditors.

3.1 Audit risk model hypotheses

One of the primary focuses of this study was to test implications of the audit risk model. The discussion of the audit process in Chapter I noted that it is difficult to assess inherent risk independently of control risk. For this reason, the current study combined the assessment of inherent risk and control risk to form a general environment factor called "expectations of errors." The variables which were examined in this study were expectations of errors (EE), analytical review risk (ARR), and tests of details risk (TDR). SAS No. 39 [1981] and SAS No. 47 [1983] suggest that expectations of errors, analytical review risk and test of details risk should be combined multiplicatively in the audit risk model with equal weights assigned to

each component⁸. The formulation of the audit risk model suggested by SAS No. 39 [1981] and SAS No. 47 [1983] can be stated as follows:

$$AR = EE \times ARR \times TDR \quad (6)$$

- Where:
- AR - audit risk is the risk that a material misstatement that could exist in an account balance would remain undetected after the auditor has completed all procedures deemed necessary.
 - EE - expectations of errors is the risk that a material misstatement 1) could occur in an account balance (inherent risk) and 2) not be prevented or detected on a timely basis by the entity's internal control structure (control risk).
 - ARR - analytical review risk is the risk that the auditor's analytical review procedures would not detect a material misstatement that could exist in an account balance.
 - TDR - tests of details risk is the risk that the auditor's substantive tests of details and transactions would not detect a material misstatement that could exist in an account balance.

Studies in psychology (See Kahneman, Slovic, and Tversky, 1982) suggest that decision makers often use heuristics, which are less complex than the multiplicative rule implied by the audit risk model. Additionally, probabilistic judgment research has indicated that compound probabilities are not well understood or used by decision makers. Further, lens model research has frequently found simple additive rules to be representative of decision makers' judgments (see Libby, 1981 and Ashton, 1982). These research studies suggest that an additive composition rule of expectations of errors, analytical review risk and tests of details risk may be more representative of auditor

⁸ Although SAS No. 47 [1983] did not explicitly provide a formula for combining the components, it refers to the SAS No. 39 [1981] model in such a manner that implies that the multiplicative combination of components would still be appropriate.

behavior. An additive composition rule can be represented using the following general formulation:

$$AR = w_1(E E) + w_2(ARR) + w_3(TDR) \quad (7)$$

Where: w_i = the weight assigned to risk component.

Because this formulation deviates from the formulation suggested by SAS No. 39 [1981] and SAS No. 47 [1983] additional research is needed to determine the exact formulation of audit risk decisions made in practice.

Previous accounting studies have found composition models other than the multiplicative and additive models to characterize judgments. For example, Messier and Emery [1980] and Moriarity and Barron [1976] have found distributive composition rules to characterize judgments. An example of a distributive composition rule is as follows:

$$AR = w_1(E E)[w_2(ARR) + w_3(TDR)] \quad (8)$$

The distributive composition rule formulation of the audit risk model is provided to further demonstrate the possible existence of other risk models.

This research effort addressed the following hypothesis related to the composition rule followed by auditors (All hypotheses are stated in alternative form):

H_1 : Auditors' audit risk assessments follow a multiplicative composition rule of expectations of errors, analytical review risk and tests of details risk.

The discussion in the previous chapter reviewed research studies examining the effects of inherent and control risk factors on auditor judgments. The overwhelming finding of these studies was that risk factors differentially affect auditor judgments. These findings

suggest that risk factors will differentially affect auditor risk assessments for the current study. This research effort addressed the following hypothesis related to the cue weightings used by auditors:

- H₂: Auditors' assign unequal relative weights to the expectations of errors factor, analytical review risk factor and tests of details risk factor.

3.2 Judgment task hypotheses

Another focus of this research effort was to examine the effect of the judgment task on audit risk. The discussion of the audit planning process developed in Chapter I argued that audit risk should be evaluated at a disaggregated level. In particular, audit risk should be evaluated with respect to specific audit objectives associated with sets of related transactions and balances. Auditors evaluate internal controls and design audit procedures to support one or more individual audit objectives. When sufficient competent evidence is gathered to support each individual audit objective the auditor then aggregates and extends the conclusions to formulate an opinion on the financial statements taken as a whole. Previous auditing studies have predominately investigated audit risk assessments at either the cycle or account level. The current study utilized a more representative decision task by requiring auditors to evaluate audit risk with respect to a specific audit objective.

Empirical evidence from the psychological literature indicates that probabilities elicited from individuals at one level of aggregation do not agree with those elicited at finer levels of aggregation

(See Kahneman, Slovic, and Tversky, 1982). As Einhorn & Hogarth [1981] state:

The most important empirical results of the period under review have shown the sensitivity of judgment and choice to seemingly minor changes in tasks.

Risk assessments made with respect to a specific audit objective within an account represents a finer level of aggregation than risk evaluations made with respect to a specific account. The above discussion suggests that risk assessments made with respect to a specific audit objective within an account will differ from risk assessments made with respect to a specific account. This research effort addressed the following hypothesis related to auditor judgment task:

H₃: Auditors' audit risk assessments will differ when assessments are made at the account level as compared to when they are made at the audit objective level.

Previous auditing studies concerned with the assessment of audit risk have obtained conflicting results. One possible explanation for these conflicting results is the differing judgment tasks employed by these studies. To address these previous research differences the current study examined the assessment of audit risk at two levels of aggregation to determine what effect, if any, the judgment task had on the composition rules followed by auditors.

The expectation with respect to inter-auditor consensus was that consensus would increase as the judgment task became more representative of the real world setting. To support the notion that inter-auditor consensus would be higher at finer levels of aggregation, psychology literature (See Slovic, Fischhoff, and Lichtenstein, 1977) suggests that performing a series of tasks for the components of a

decomposed problem is easier than a holistic judgment for the entire problem in all its complexity. Decomposition is said to improve judgments by reducing cognitive strain. This suggests that inter-auditor consensus would increase as the judgment task is decomposed into finer levels of aggregation. The expectation for the current study was that consensus would be higher for risk assessments made with respect to specific audit objectives within accounts as compared to assessments made with respect to specific accounts. Assessments made with respect to specific audit objectives within accounts is a finer level of aggregation than assessments made with respect to specific accounts. The current research effort addressed the following hypothesis related to auditor consensus:

- H₄: Auditors will show a higher level of consensus when evaluating audit risk or audit risk cues at the audit objective level as compared to the account level.

Previous auditing studies have found auditor consensus to be relatively high. The judgment task employed by these studies is unrepresentative of the actual judgment task encountered by auditors. Whether the consensus results obtained by these studies can be generalized to a different more representative judgment task is an open empirical question. To address this issue the current study examined the assessment of audit risk at two levels of aggregation to determine what effect, if any, the judgment task had on auditor consensus.

3.3 Summary

The research hypotheses tested by the current research effort were developed and summarized in this chapter. The next chapter has a

discussion of the methodology employed to test these hypotheses. The analysis of the results of the study follow in the subsequent chapter.

CHAPTER IV

METHODOLOGY

4. Overview of Research Methodology

The purpose of this chapter is to discuss the procedures employed to test the hypotheses developed in the previous chapter. The first section gives an overview of the two experiments that were conducted. The second section gives a description of the research design of the first experiment. The third section gives a description of the research design of the second experiment. The final section gives a summary of the chapter.

4.1 Research design overview

The objective of this research study was to obtain a better understanding of external auditors' subjective assessment of audit risk. To achieve this objective two interrelated experiments were conducted. The purpose of the first experiment was to develop operational definitions for each component of the audit risk model. The goal was to select a set of cues to manipulate in the second experiment. In the first experiment, participants were given an instrument which listed cues pertinent to the assessment of expectations of errors, analytical review risk and tests of details risk. Participants were then requested to indicate the relative influence of each cue on their assessment of the applicable risk component. Two separate instruments were used for this experiment. One instrument asked participants to evaluate risk component cues with respect to a specific account. The other instrument asked participants to evaluate risk

component cues with respect to a specific audit objective within an account. The two instruments used for the first experiment are presented in Appendix A. A detailed discussion of the first experiment follows in section 4.2.

The primary objective of the second experiment was to model auditors' subjective assessment of audit risk and to examine the effect of the judgment task on auditor risk assessments. In this experiment, auditor participants were given a set of eight cases and asked to evaluate the audit risk of each case. The eight cases were generated by systematically varying all possible combinations of two levels for expectations of errors, analytical review risk and tests of details risk. Two separate instruments were used in this study. One instrument asked participants to evaluate the cases with respect to a specific account. The other instrument asked participants to evaluate the cases with respect to a specific audit objective within an account. The experiment had one between-subject factor with three within-subject factors, a 2×2^3 mixed factorial design. The between-subject factor was the judgment task (account level/audit objective level). The within-subject factors were expectations of errors, analytical review risk and tests of details risk. The research design is diagrammed in Figure 4.1. The between-subject factor is represented by the two blocks of cells while, the within-subject factors are represented by the cells within each block. A detailed discussion of the second experiment follows in section 4.3.

Account level
EXPECTATIONS OF ERRORS

		High ANALYTICAL REVIEW		Low ANALYTICAL REVIEW	
		High	Low	High	Low
T E S T S O F D E T A I L	High				
	Low				

Objective level
EXPECTATIONS OF ERRORS

		High ANALYTICAL REVIEW		Low ANALYTICAL REVIEW	
		High	Low	High	Low
T E S T S O F D E T A I L	High				
	Low				

FIGURE 4.1
Experimental Design (for each Aggregation Level)

4.2 Experiment I

Many cues are considered by auditors when evaluating the components of the audit risk model. While it may seem desirable to incorporate all cues in a case study examining the assessment of audit risk by practitioners, allowing all cues to vary would make the information load excessive on auditor participants. Therefore, it was necessary to identify operational definitions for each component of the audit risk model. The objective was to reduce the dimensional descriptions of each risk component so that the information load on the participants would not be excessive in the second and final phase of this study. The fifth research question was addressed by the first experiment.

The remainder of the discussion is broken into four subsections to cover the issues addressed by the first experiment. The first subsection gives a description of the case materials used in this study as well as describing the development of the case materials. The second subsection provides a description of the participants. The third subsection provides a brief description of the administration of the study. The final subsection describes the statistical procedures which were used to analyze the results. Also included in this final section is an identification and discussion of the independent and dependent variables.

4.2.1 Experiment I Instrument

The first experiment was concerned with determining what cues auditors considered most important when assessing expectations of

errors, analytical review risk and tests of details risk. This goal was achieved by asking auditor participants to evaluate a list of cues related to the assessment of these risk components. Participants were asked to indicate, using a seven point Likert type scale how much influence each cue has on their assessment of the relevant risk component. The instruments used for the first experiment are displayed in Appendix A. Each risk component headed a different page of the instrument. This allowed the auditor participants to proceed through the instrument efficiently while explicitly directing their attention to each risk component. Haskins [1987] and Kaplan and Reckers [1984] indicate that the cues auditors consider important when assessing audit risk will vary depending upon the context in which the assessments are being made. For this reason, two separate instruments were constructed, one for each judgment task. One instrument asked participants to evaluate risk cues with respect to a specific account. The other instrument asked participants to evaluate risk cues with respect to a specific audit objective within an account. The instruments were identical in all respects except for the aggregation level in which participants were asked to make risk assessments. The two judgment tasks were chosen so that comparisons could be made between the model of the audit process developed in Chapter I and previous auditing studies discussed in Chapter II.

The original list of risk component cues and case materials was constructed using the following sources:

- Current authoritative literature (SAS No. 1, 1973; SAS No. 39, 1981; SAS No. 47, 1984; and SAS No. 55, 1988).
- Previous auditing research (See literature review).

- Auditing text (Arens and Loebbecke, 1988).
- Researcher's audit experience.

The initial draft of the list of risk component cues and case materials was reviewed by faculty and doctoral students at Michigan State University. A revised list of risk component cues and case materials was derived from this review. The second draft of risk component cues and case materials was sent to three practicing audit managers from Big Eight accounting firms and two senior managers from the Executive offices of Big Eight accounting firms. The five managers did not participate in either the first or second experiment. The managers were asked to review the list of risk component cues with respect to their validity, completeness, relevance and understandability. Additionally, the managers were asked to review the case materials for clarity of instructions, time requirements and appropriateness of the measurement scale. A revised list of risk component cues and case materials was derived as a result of this step. For a final pilot review, this third version of the list of risk component cues and case materials was sent to the two senior managers noted above with instructions to again review the list of risk component attributes for validity, completeness, relevance and understandability. No changes were made as a result of this final review.

The case materials administered to the participants contained a signed cover letter, instructions, detailed background information and a request for demographic information. The case materials pertained to an actual manufacturing company. A copy of the instruments are

included in Appendix A. The background information included the following information:

- Financial statements.
- Footnotes to the financial statements.
- Role of the participant.
- Previous audit reports issued.
- Exchange listing of company.
- Nature of company's operations.

The background information was provided as a frame of reference for the auditors' evaluations. Detailed background information about a specific company was provided to control for other variables which could influence auditors' judgments. Haskins [1987] indicated that client and firm contextual variables such as client size and complexity were associated with control risk cues. Detailed background information was provided in an attempt to have participants begin with the same anchors. The more information provided about the client the fewer unanswered questions participants should have with respect to that client. The fewer the number of unanswered questions, the fewer the number of times participants will have to draw on their own audit experience to answer these questions.

A manufacturing company was selected since manufacturing contains more firms than any other industry. The selection of a manufacturing company will allow the results to be generalizable to a broader segment of the economy. Demographic information was collected from the participants. Included in this section was a question on the participants intrinsic motivation to complete the task. Data provided in response to the debriefing questions was used in interpreting the results of the study. For example, debriefing data was used to assess the homogeneity

of the two treatment groups. The background information collected was based on a review of prior research and pilot test.

4.2.2 Experiment I Participants

The selection of auditors was restricted to Big Eight accounting firms because of the ability to obtain a relatively large number of participants from a few firms. Limiting the participants to a few firms enabled the researcher to exercise finer control over the experiment. Moreover, limiting the number of firms allowed the researcher to reduce one source of variability in participant responses. A group of participants selected from a few firms should be more homogeneous than a group of participants selected from the total population of auditors. Seventy one auditors from six Big Eight accounting firms participated in the first experiment. Demographic information about the participants appears in Table 4.1. The questions used to obtain this information are shown in Appendix A.

The participants were obtained by contacting a person from each of the firms. The contact people were given a copy of the research proposal and asked if they would solicit participation from some of the managers with line audit responsibility within their firm. It was preferable that the participants had some experience with manufacturing companies. Therefore, participant selection was not random.

Participation from audit managers was requested because they are intimately involved in the planning and execution of an audit and are sufficiently experienced to provide risk assessment judgments. The position level of the auditors participating in the first experiment is

TABLE 4.1
Demographic Information About Experiment I Participants

Office location of auditors:	Number of Auditors	Percentage
Atlanta	6	8.5%
Birmingham	1	1.4
Boston	1	1.4
Buffalo	1	1.4
Chicago	1	1.4
Cleveland	1	1.4
Columbus	1	1.4
Detroit	37	52.1
Greensboro	1	1.4
Jacksonville	1	1.4
Los Angeles	1	1.4
Louisville	1	1.4
New York	12	16.9
Oakland	1	1.4
Richmond	2	2.8
Saint Paul	2	2.8
Stamford	1	1.4
	<u>71</u>	<u>100.0%</u>

Position of auditors	Number of Auditors	Percentage
Senior	1	1.4%
Supervisor	6	8.5
Manager	63	88.7
Partner	1	1.4
	<u>71</u>	<u>100.0%</u>

Firm of auditor	Number of Auditors	Percentage
Arthur Andersen & Co.	12	16.9%
Coopers & Lybrand	21	29.6
Deloitte Haskins & Sells	6	8.5
Ernst & Whinney	11	15.5
Price Waterhouse	2	2.8
Touche Ross & Co.	19	26.8
	<u>71</u>	<u>100.0%</u>

Mean age of participants	31.4
Mean number of years employed in public accounting	8.5
Mean number of years employed at present job title	2.9
Mean percentage of audit time spent on manufacturing clients . .	42%

presented in Table 4.1. Experience with manufacturing companies was requested because of the type of company portrayed in the case materials.

Although the selection method for the auditors was not random, it is expected that the auditors who participated in this study are generally representative of auditors who work for Big Eight accounting firms. Support for this statement is provided by the discussion in Chapter V, section 5.1.4 where the generalizability of the results was tested.

Participants completed either the account level or audit objective level instrument. Restricting the participants to complete one instrument allowed the researcher to eliminate one possible source of confounding in the results. Requiring participants to complete both instruments could have caused the participants to respond differently than they otherwise would have responded. For example, a participant who just completed the audit objective level instrument might think the researcher really wanted the account level instrument to be completed with respect to another audit objective and thus, act accordingly. Thirty six of the participants completed the account level instrument while thirty five participants completed the audit objective level instrument. The researcher was unable to randomly assign participants to the two treatment groups because of the manner in which the first experiment was administered. Non-random designs increase the possibility of having unrecognized systematic differences between treatment groups. The results of tests discussed in Chapter V, section

5.1.4 indicate that participants assigned to the two treatment groups were homogeneous.

4.2.3 Experiment I Administration

The first experiment instrument was administered with the help of a contact person for forty seven of the seventy one participants. Detailed verbal and written instructions were given to the contact people along with the appropriate number of booklets for the participants they agreed to provide. There was no direct communication between the researcher and the participants. The contact person was responsible for selecting the participants, distributing the two types of instruments (account level/audit objective level) equally among the participants, collecting the instruments from the participants and returning the booklets to the researcher. The contact person was asked to provide an endorsement letter with each booklet to increase the sense of importance participants place on the task. For any of the booklets that had not been returned within three weeks of their mailing, the contact person was called and reminded of the need to follow-up with their participants. All forty seven of the instruments distributed were returned completed.

The first experiment instrument was administered through the mail directly by the researcher for the remaining twenty four participants. The method of administration was dependent on the preference of each participating firm. A list of the participants was provided to the researcher by the contact person at the respective Big Eight accounting firm. The booklets were sent directly to the participants by the

researcher. The participants also received an endorsement letter from their respective firm. The endorsement letter was provided by the national audit director for one firm and the partner in charge of the respective office for the other firms. For any booklets that had not been received within three weeks of their mailing, a second request letter was sent to the participant. Twenty four of the twenty six booklets mailed were eventually returned completed.

4.2.4 Experiment I Analysis

Before a detailed analysis could be conducted with respect to the auditor's subjective assessment of audit risk, realistic and materially different case manipulations had to be developed. The purpose of the first experiment was to obtain a small set of risk component cues that could be manipulated in the second experiment. The goal was to manipulate those risk component cues deemed most important across all auditors. The relative importance of risk component cues was determined by comparing the means of the participants' importance ratings. Relative agreement across auditors was determined by comparing the variances of the importance ratings. Support for using variances to determine relative agreement across auditors is provided by the psychology literature. There, Ghiselli et al. [1981] note that the variance of an item reflects ambiguity. If an item has a large variance, then the group of judges disagree on the importance or unimportance of that item. Small variances reflect agreement among the group of judges. Therefore, items with large variances and low mean ratings should be excluded from the item pool. Risk component cues

with high means and low variances were selected for inclusion in the second experiment instrument. This selection was achieved by plotting the mean rating for each risk component cue against its respective variance and selecting from those that were in the upper left hand quadrant of the graph. Figure 4.2 exhibits an example of such a graph. The actual graphs used by the current study are presented and discussed in Chapter V. The above procedure provided a method for subjectively evaluating the relative importance of risk component cues across all auditors. The purpose of the first experiment was to select risk component cues to manipulate for the second experiment. Therefore, no hypotheses were developed regarding the relative ordering of the risk component cues.

While the primary goal of the first experiment was to select risk component cues for manipulation in the second experiment, the experiment was also useful in addressing research questions three and four. Research question three addressed the effect of the judgment task on auditor evaluations. Two different instruments were used to examine research question three (account level/audit objective level). Multivariate analysis of variance (MANOVA) techniques were used to examine the effect of the judgment task on auditor evaluations. MANOVA is a statistical technique used to study the effect of multiple treatment (independent) variables measured on two or more dependent variables simultaneously (Tatsuoka, 1971). Under the null, the statistical hypothesis tested is the equality of the dependent mean vectors (or centroids) across the two treatment groups. Risk component cues relating directly to the valuation audit objective should have

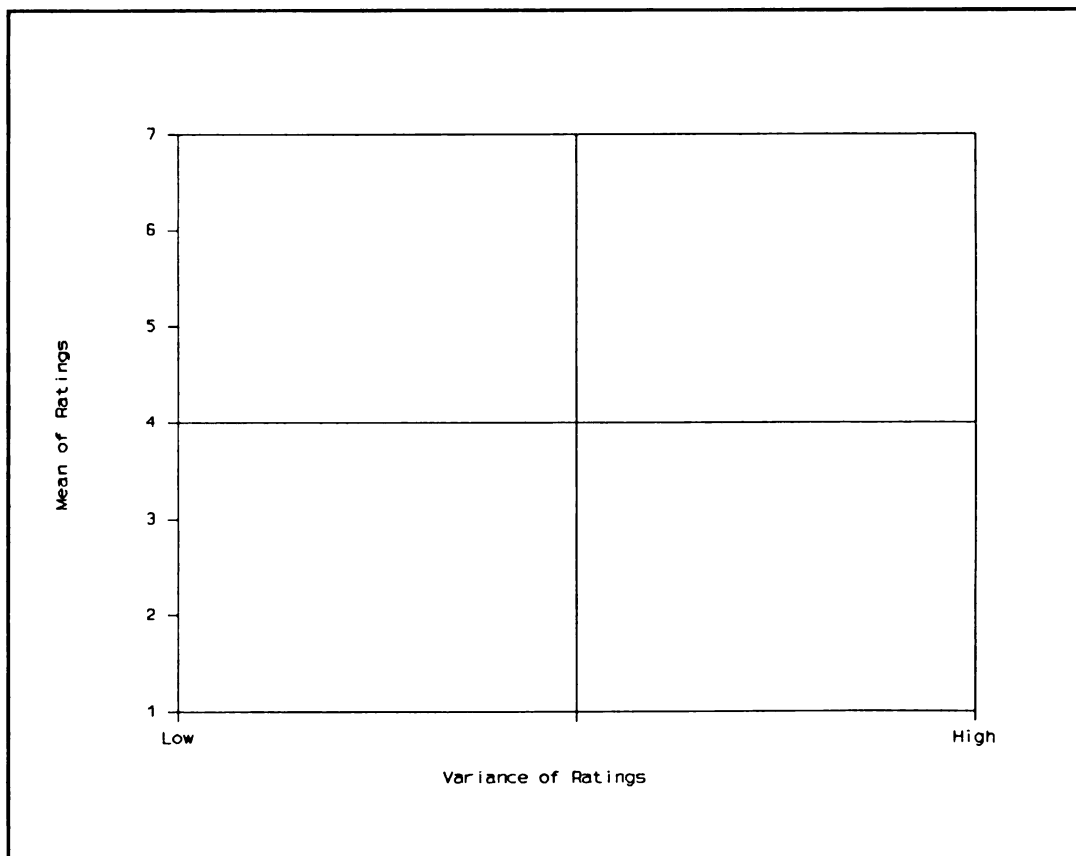


Figure 4.2
Plot of Participant Ratings

higher mean ratings for the audit objective level instrument as compared to the account level instrument while, risk component cues relating to other audit objectives should have higher mean ratings for the account level instrument. No a priori direction was hypothesized for the centroid. The dependent variables for this experiment were the risk component cues. The independent variable was the judgment task (account level/audit objective level).

The final research question addressed by the first experiment was the effect of the judgment task on auditor consensus. Again, two separate instruments were used to examine this research question (account level/audit objective level). The mean correlation coefficient across participants was used to examine research question four. The mean correlation coefficient was calculated by averaging the correlation coefficient between each pair of participant responses on the risk component cues⁹. The use of this measure of consensus is consistent with prior consensus studies as discussed in the literature review chapter. A total of 630 correlation coefficients were calculated for the account level instrument and 595 correlation coefficients were calculated for the audit objective level instrument. ANOVA and the Kruskal-Wallis nonparametric ANOVA were used to test for differences between the two judgment tasks. The Kruskal-Wallis procedure tests whether independent groups are drawn from different populations. This procedure ranks the n observations of each group in a single series. The sum of the ranks for each group are compared to

⁹ Both the Pearson product-moment correlation coefficients and the Spearman rank order correlation coefficients were calculated for each pair of subjects.

determine if the observation for the groups were drawn from the same population (Siegel, 1956). The dependent variables for this analysis were participants evaluations of the risk component cues. The independent variable was the judgment task (account level/audit objective level). The research hypothesis was that consensus would be higher for evaluations made with respect to a specific audit objective as compared to evaluations made with respect to a specific account. In statistical terms hypothesis four can be stated as follows for the mean correlations:

$$H_A: C_{obj.} > C_{acc.}$$

Where: C = mean of correlation coefficients.

4.3 Experiment II

The second experiment addressed research questions one, two, three and four. Research questions one and two were concerned with ascertaining the composition rule and scale values that are consistent with the auditors' subjective assessment of audit risk. Model diagnostics were conducted on both risk assessments made at the audit objective level and risk assessments made at the account level. Research questions three and four were concerned with the effect of judgment task on auditor decisions.

Like the previous section, this section is broken into subsections to explain the development and application of the second experiment. A description of the case materials along with a discussion of the development of those case materials is provided in the first subsection. The second subsection contains a description of the

participants and how their assistance was obtained. The third subsection contains a discussion of the administration of the second experiment. The final subsection contains a description of the statistical procedures used to analyze the results. Included in this last subsection is a discussion of independent and dependent variables.

4.3.1 Experiment II Instrument

In this experiment participants were given eight cases and asked to evaluate the audit risk of each case using a nine point Likert type scale. The eight cases were generated for each instrument by systematically varying all possible combinations of two levels for expectations of errors, analytical review risk and tests of details risk. Two separate instruments were generated for each judgment task. One instrument asked participants to evaluate the cases with respect to a specific account while the other instrument asked auditors to evaluate the cases with respect to a specific audit objective within an account. The instruments were identical in all respects except for the aggregation level in which participants were asked to make risk assessments. The case materials were distributed to the participants using four different orderings of the eight cases. The instruments used for the second experiment are presented in Appendix B.

The manipulations to expectations of errors, analytical review risk and tests of details risk were chosen based on the first experiment and a pilot test. The initial draft of the case materials was reviewed by faculty and doctoral students at Michigan State University. Revisions were made to correct ambiguous questions and instructions.

The second version of the case materials was sent to three practicing audit managers from Big Eight accounting firms and two senior managers from the executive offices of Big Eight accounting firms for pilot testing. The managers were asked to review the instruments for clarity of instructions, time requirements, appropriateness of the manipulations and clarity of the measurement scale. The reviewers' suggestions and comments were incorporated into the case materials. The third version of the case materials was sent to one of the senior managers for a final review. No changes were made as a result of this review.

4.3.2 Experiment II Participants

Sixty one of the 71 auditors who participated in the first experiment participated in the second experiment. Three auditors did not complete the second instrument as they no longer were employed by the respective Big Eight accounting firm. The remaining seven non-respondents simply failed to complete the second instrument. Participants were limited to completing either the account level or audit objective level instrument. Thirty of the auditors completed the account level instrument while thirty one of the auditors completed the audit objective level instrument. The researcher was unable to randomly assign participants to the two treatment groups because of the manner in which the second experiment was administered. Non-random designs increase the possibility of having systematic differences between treatment groups. The results of tests discussed in Chapter V, section 5.2.5 indicate that participants assigned to the two treatment groups were homogeneous. Demographic information about the

participants is displayed in Table 4.2. The questions used to obtain this information can be found in Appendix B.

4.3.3 Experiment II Administration

The second instrument was administered with the help of a contact person for forty one of the 61 participants. Detailed verbal and written instructions were given to the contact people along with the appropriate number of booklets for the participants they agreed to provide. There was no direct communication between the researcher and the participants. The contact person was responsible for distributing the instruments, collecting the instruments from the participants and returning the booklets to the researcher. The contact person was instructed that the participants should receive the same instrument type (account level/audit objective level) they had received in the first phase of this study. Participants were required to complete the same instrument type to eliminate one possible source of confounding in the results. For example, a participant who completed the audit objective level instrument for the first experiment might think that the researcher wanted the second instrument to be completed with respect to the same audit objective even though the instrument specified an account. The contact person was also asked to provide an endorsement letter with each booklet to increase the sense of importance participants place on the task. For any of the booklets that had not been returned within three weeks of their mailing, the contact person was called and reminded of the need to follow-up with their

TABLE 4.2
Demographic Information About Experiment II Participants

Office location of auditors:	Number of auditors	Percentage
Atlanta	5	8.2%
Birmingham	1	1.6
Boston	1	1.6
Buffalo	1	1.6
Chicago	1	1.6
Cleveland	1	1.6
Columbus	2	3.3
Detroit	32	52.5
Greensboro	1	1.6
Jacksonville	1	1.6
New York	10	16.4
Oakland	1	1.6
Richmond	2	3.3
Saint Paul	1	1.6
Stamford	<u>1</u>	<u>1.6</u>
	<u>61</u>	<u>100.0%</u>

Position of auditors	Number of auditors	Percentage
Senior	1	1.6%
Supervisor	5	8.2
Manager	41	67.2
Partner	<u>14</u>	<u>23.0</u>
	<u>61</u>	<u>100.0%</u>

Firm of auditor	Number of auditors	Percentage
Arthur Andersen & Co.	11	18.0%
Coopers & Lybrand	20	32.8
Deloitte Haskins & Sells	6	9.8
Ernst & Whinney	7	11.5
Price Waterhouse	2	3.3
Touche Ross & Co.	<u>15</u>	<u>24.6</u>
	<u>61</u>	<u>100.0%</u>

Mean age of participants	31.75
Mean number of years employed in public accounting	8.7
Mean number of years employed at present job title	2.2
Mean percentage of audit time spent on manufacturing clients . .	44%

participants. Forty one of the 47 instruments distributed were eventually returned completed.

The second instrument was administered over the mail directly by the researcher for the remaining twenty participants. The instruments were sent directly by the researcher to the same participants who participated in the first experiment. The participants received the same instrument type they received in the first experiment. Again, this was done to eliminate one possible source of confounding in the results. For any instruments that had not been received within two weeks of their mailing, a second request letter was sent to the participant. A third request letter was sent after another two weeks elapsed. Twenty of the twenty four booklets mailed were eventually returned completed.

4.3.4 Experiment II Analysis

The first two research questions were concerned with determining the composition rule and scale values that are consistent with the auditors' subjective assessment of audit risk. ANOVA techniques were used to diagnose the model followed by participants. A large percentage of the behavioral research performed in auditing has used ANOVA techniques with a repeated measures design. The primary advantage of using a repeated measure design is to control subject heterogeneity (see Keppel, 1982). To the extent individuals differ, the repeated measures design, as compared to the between subjects design, increases the statistical power of the hypotheses tests. The primary disadvantage of the repeated measures design is the restrictive

assumption pertaining to the variance-covariance matrix. Another disadvantage of the repeated measures design is the potential "demand characteristics" problem. Repeated measures designs allow participants to see the manipulations to the independent variable enabling participants to guess the research questions and thus act accordingly. It would be relatively easy for participants to guess the research question if the objective of the current study was to determine whether auditors consider each of the risk component factors when subjectively evaluating audit risk. The current study, however is concerned with determining the composition rule for audit risk, not with determining whether auditors consider each factor when subjectively evaluating audit risk. It is not as likely that the participants will guess this research question.

The dependent variable for this experiment was the participant's assessment of audit risk. The independent variables were the manipulations to expectations of errors, analytical review risk and tests of details risk.

The general ANOVA equation can be expressed as follows:

$$AR_{ijk} = \mu + \alpha_i + \beta_j + \pi_k + \alpha\beta_{ij} + \alpha\pi_{ik} + \beta\pi_{jk} + \alpha\beta\pi_{ijk} + \epsilon_{ijk}$$

Where: μ - the overall mean of the population.

α_i - the effect of expectations of errors at level i
 $(\mu_i - \mu)$.

β_j - the effect of analytical review risk at level j
 $(\mu_j - \mu)$.

π_k - the effect of tests of details risk at level k
 $(\mu_k - \mu)$.

$\alpha\beta_{ij}$ - the interaction effect of expectations of errors and analytical review risk at level i and j
 $(\mu_{ij} - \mu_i - \mu_j + \mu)$.

- $\alpha\pi_{ik}$ - the interaction effect of expectations of errors and tests of details risk at level i and k
 $(\mu_{ik} - \mu_i - \mu_k + \mu)$.
- $\beta\pi_{jk}$ - the interaction effect of analytical review risk and tests of details risk at level j and k
 $(\mu_{jk} - \mu_j - \mu_k + \mu)$.
- $\alpha\beta\pi_{ijk}$ - the interaction effect of expectations of errors, analytical review risk, and tests of details risk at level i, j, and k
 $(\mu_{ijk} - \mu_{ij} - \mu_{ik} - \mu_{jk} + \mu_i + \mu_j + \mu_k - \mu)$.
- ϵ_{ijk} - experimental error.

The subject effect terms have been omitted from the equation as they are not of primary interest in this study. Research question one was concerned with the composition rule followed by auditors. The null hypothesis was that auditors follow an additive composition rule when subjectively evaluating audit risk. Under the null, the statistical hypothesis for an additive model can be stated as follows:

$$\text{All } \alpha_i, \beta_j, \text{ and } \pi_k > 0 \text{ and}$$

$$\text{All } \alpha\beta_{ij}, \alpha\pi_{ik}, \beta\pi_{jk}, \text{ and } \alpha\beta\pi_{ijk} = 0$$

The null hypotheses of an additive model can be rejected if any of the interaction terms are significantly different from zero.

Research question two was concerned with determining the scale values consistent with the auditors subjective assessment of audit risk. The presence of a significant F test gives some assurance that a statistical association exists. However, the F test does not reflect the degree of this association unambiguously. Omega squared will be used to give a measure of the relative treatment effect (i.e. scale values) of each risk component. Omega squared is an index which provides a measure of the association of the main effects and interaction effects with all other effects, relative to the strength of these

effects. Omega squared allows the effects to be analyzed in terms of degree, rather than in terms of significance.

The development of the alternative hypothesis predicts that auditors follow a multiplicative composition rule, yet the ANOVA procedure assumes a linear model. This linearity assumption would have created problems had the null hypothesis of an additive model been rejected. The inadequacies of the ANOVA model can be seen by noting that the variation attributed to the interaction effects is only that variation which cannot be attributed to the main effects or lower order interactions. The size of the treatment effects (scale values) could not have been uniquely attributed to expectations of errors, analytical review risk or tests of details risk had the additive model been rejected. If the results had indicated that auditors follow a multiplicative model the dependent measure would have been transformed by taking the natural log of the dependent measure¹⁰. This transformation does assume that the error term is multiplicative and changes the interpretation of the coefficients. The coefficients now represent the percentage change in the dependent measure which can be attributed to each respective factor. The statistical hypothesis for a multiplicative model can then be stated as follows:

$$\text{All } \alpha_i, \beta_j, \text{ and } \pi_k > 0 \text{ and}$$

$$\text{All } \alpha\beta_{ij}, \alpha\pi_{ik}, \beta\pi_{jk}, \text{ and } \alpha\beta\pi_{ijk} = 0$$

Research question three was concerned with the effect of the judgment task on the auditors' assessment of audit risk (account

¹⁰ A multiplicative composition rule can be transformed into an additive model by taking the natural log of the dependent measure.

level/audit objective level). ANOVA techniques were used to address research question three. The dependent variable for this experiment was the auditors' subjective assessment of audit risk. The independent variables were the manipulations to expectations of errors, analytical review risk, tests of details risk and judgment task (account level/audit objective level). The null hypothesis for research question three was that the judgment task would not affect auditors' risk assessments. The null statistical hypothesis for the effect of judgment task can be stated as follows:

$$H_0: \Gamma_i = 0$$

Where: Γ_i = the effect of judgment task at level i ($\mu_i - \mu$).

Research question four was concerned with the effect of the judgment task on auditor consensus (account level/audit objective level). Consistent with prior consensus studies, mean correlations were employed as a measure of consensus. The consensus measure was calculated by averaging the correlation coefficients between each pair of participants on the eight audit risk judgments¹¹. A total of 435 correlation coefficients were calculated for the account level instrument and 465 correlation coefficients were calculated for the audit objective level instrument. Additionally, the variance around the mean ratings of each case was used as an alternative form for examining agreement among auditors. ANOVA and the Kruskal-Wallis nonparametric ANOVA was used to test for differences between the two judgment tasks. The Kruskal-Wallis procedure tests to determine if independent groups

¹¹ Both the Pearson product-moment correlation coefficients and Spearman rank order correlation coefficients were calculated for each pair of subjects.

are drawn from different populations. This procedure ranks the n observations of each group in a single series. The sum of the ranks for each group are compared to determine if the observation for the groups were drawn from the same population (Siegel, 1956). The dependent variable for this analyses was the participants' audit risk assessments for the eight cases. The independent variable was the judgment task (account level/audit objective level). The research hypothesis was that consensus would be higher for assessments made with respect to a specific audit objective as compared to assessments made with respect to a specific account. In statistical terms this hypothesis can be stated as follows for the mean correlations and variances:

$$H_A: C_{obj.} > C_{acc.}$$

$$H_A: \text{Variance}_{obj.} < \text{Variance}_{acc.}$$

Where: C = mean of correlation coefficients.

The above test indicates whether consensus differs across the two judgment tasks, however it does not tell the nature of these differences. Social judgment theory was used to determine the nature of these differences. Social judgment theory is useful when no criterion event is available. Social judgment theory recommends replacing the criterion event with consensus. Under this theory agreement between two evaluators is a function of their agreement on cue weighting (G), each individual's consistency (R) and configurality (C) (Bonner, 1988). Thus, the overall consensus between two evaluators can be broken down into components as follows:

$$r_s = G \times R_1 \times R_2 + C[(1 - R_1)^2(1 - R_2)^2]^{1/2}$$

Where: r_1 = correlation between participant 1 and participant 2's assessments.

G = correlation between predictions based on models of participant 1 and participant 2's assessments.

R_1 = consistency of participant 1 in applying his/her judgment policy (i.e. correlation between participant 1's assessment and the assessment predicted by the participant's model).

C = correlation between the residuals from participant 1 and participant 2's models.

Each of the above components of consensus were examined to determine the nature of the differences in auditor consensus across the two judgment tasks (account level/audit objective level).

4.4 Summary

An outline of the experimental setting, task, administration and investigative techniques used for the research questions were discussed in this chapter. The first section contained a general overview of the two interrelated experiments. The second section contained a detailed discussion of the first experiment. This experiment was primarily concerned with obtaining a set of cues to manipulate for the second experiment. Participants were asked to evaluate the relative importance of a set of risk component cues related to the assessment of audit risk. The third section contained a detailed discussion of the second experiment. The goal of the second experiment was twofold. First, to determine the composition rule and scale values used by auditors when subjectively assessing audit risk. Second, to determine the effect of the judgment task (account level/audit objective level) on auditors' subjective assessment of audit risk. Participants were

asked to assess audit risk for a set of eight cases. Approximately half the participants evaluated the cases with respect to a specific account while the other half evaluated the cases with respect to a specific audit objective within the account. The analysis of the results follows in the next chapter.

CHAPTER V

ANALYSIS

5. Overview of Data Analysis

This chapter contains a discussion of the results of the current study. As mentioned previously, two interrelated experiments were conducted. The goal of the first experiment was to select a set of risk cues to manipulate in the second experiment. The goal of the second experiment was to model auditors' subjective assessment of audit risk and to examine the effect of the judgment task on auditor risk assessments. The discussion in this chapter is organized around the two interrelated experiments. The first section contains a discussion of the results of the first experiment. The second section contains a discussion of the results of the second experiment. The final section contains a summary of the chapter.

5.1 Experiment I results

This section presents the results of administering the first experiment. The first experiment was primarily interested with addressing research question five. Research question five was concerned with the relative ranking of risk component cues. Although the primary purpose was to address research question five the first experiment was also useful in addressing research questions three and four. Research question three was concerned with the effect of the judgment task on auditor risk assessments. Research question four was concerned with the effect of the judgment task on auditor consensus. This section is organized around the three research questions. The

first subsection contains a discussion of the results obtained with respect to research question five. The second subsection contains a discussion of the results obtained with respect to research question three. The third subsection contains a discussion of the results obtained with respect to research question four. The final subsection contains an analysis of the debriefing information.

5.1.1 Importance of Risk Component Cues

As noted in Chapter IV, the primary objective of this experiment was to derive a set of risk component cues that would be manipulated in the second experiment. The goal was to insure that participants would attend to the manipulations in the second experiment. Therefore, no a priori hypotheses were developed with respect to the relative importance of these risk component cues. Research question five was addressed in this subsection.

In this experiment participants were asked to indicate how much influence each risk component cue had on their assessment of the relevant risk component. Approximately half of the participants were asked to evaluate risk cues with respect to accounts receivable while the other half were asked to evaluate risk cues with respect to the valuation of accounts receivable. The mean ratings for each risk cue across all participants in each treatment group were used to evaluate the importance of risk cues.

Before performing a detailed analysis of the mean ratings it was important to determine the generalizability of these ratings. The aim was to ascertain the consistency of participant ratings across firms.

The nonparametric Kendall coefficient of concordance (W) was used to establish the generalizability of the mean ratings. The Kendall coefficient of concordance measures the relationship among several rankings for a group of individuals. Unlike correlation statistics which express the degree of association between two variables, this statistic expresses the average degree of association between several pairs of variables. The Kendall coefficient of concordance is calculated using each participants rankings on a set of variables. The Kendall coefficient of concordance, gives a measure of the agreement of rankings between participants. W ranges between zero and one, with zero signifying no agreement and one signifying complete agreement (Siegel, 1956). The null hypothesis for W is that the set of rankings are not in agreement. If the rankings across the group of individuals are unrelated, W is zero and the chi-square probability is one. The Kendall coefficient of concordance was calculated by using the mean ratings for each firm as a basis for determining the rank orderings. The mean ratings for each firm were used instead of individual responses so that individual differences could be eliminated.

Table 5.1 reports Kendall's W and the level of significance for each risk component. W ranges from a low of .51 to a high of .89 and is very significant for all risk components. Additionally eliminating firms with only two and three participants increases W more. Table 5.2 reports Kendall's W and the level of significance for each risk component after eliminating firms with only two or three participants. The results suggest that the mean ratings are relatively consistent across firms.

Table 5.1
Kendall's Coefficient of Concordance Across All Firms' Mean Ratings

Risk Component	# of Firms	Account Level W	# of Firms	Objective Level W
Expectations of Errors	5	.51**	6	.51**
Analytical Review Risk	5	.60*	6	.68**
Tests of Details Risk	5	.89**	6	.70**

* $p < .01$,

** $p < .001$.

Table 5.2
Kendall's Coefficient of Concordance Across Selected Firms' Mean Ratings

Risk Component	# of Firms	Account Level W	# of Firms	Objective Level W
Expectations of Errors	4	.74**	4	.58**
Analytical Review Risk	4	.67*	4	.83**
Tests of Details Risk	4	.87**	4	.81**

* $p < .01$,

** $p < .001$.

The results above establish the appropriateness of using the mean ratings as a basis for evaluating risk component cues. The results indicate that the relative importance of risk cues is consistent across firms and thus can be generalized to a broader segment of the population. The next step was to construct confidence intervals around the mean ratings to ascertain which of the risk component cues were significantly different from a "not important" rating. This provides evidence on which risk cues auditors considered important in the assessment of the respective risk components. A 99% confidence level was used due to the large number of items tested. This procedure resulted in none of the risk component cues having a confidence interval that encompassed the rating of "not important". These results suggest that all of the risk component cues are important. This finding is not surprising since the initial list of risk component cues was selected based on prior research which indicated that the risk component cues were important.

Tables 5.3 through 5.5 depict the means and variances for each risk component cue. These mean ratings were used to rank order the risk component cues from the most important to least important. Risk cues with the highest ratings were considered the most important while risk cues with the lowest ratings were considered the least important. Tables 5.6 through 5.11 present the rank orderings of these risk component cues.

Table 5.3
Mean Ratings of Risk Cues Related to Expectations of Errors

Cues	<u>Mean/(Variance)</u>	
	Account	Objective
	Level N = 36	Level N = 35
E1) Changes in the general economic environment of the client's industry.	4.69 (1.82)	5.23 (2.12)
E2) Number of business failures within the client's industry.	4.58 (2.25)	4.60 (2.31)
E3) Changes in the client's position within the industry.	4.19 (2.16)	4.00 (1.88)
E4) Level of competition in the client's industry.	4.17 (2.26)	3.71 (1.80)
E5) Changes in the demand for the clients product.	4.64 (2.87)	4.43 (2.43)
E6) Dependency of customers on client's products.	4.31 (2.56)	4.11 (2.40)
E7) Concentration of sales to customers.	5.36 (1.95)	5.43 (2.08)
E8) Number of business failures in industries of client's customers.	5.83 (1.91)	6.37 (.89)*
E9) Domination of the client's top, executive management by one or a few individuals.	4.08 (2.36)	4.00 (2.65)
E10) Experience and competence of client personnel in the relevant departments.	5.75 (1.39)	5.29 (1.50)
E11) Client personnel turnover in the relevant departments.	5.28 (1.58)	4.74 (1.49)
E12) Sales compensation plans.	4.69 (1.70)	4.60 (1.66)
E13) Changes in client's credit policies.	5.72 (1.12)	5.86 (1.18)
E14) Automation of the client's accounting system.	4.94 (2.00)	4.20* (1.58)

Table 5.3 (cont'd.)

Cues	<u>Mean/(Variance)</u>	
	Account Level N = 36	Objective Level N = 35
E15) Separation of the credit department from the sales department.	5.17 (2.09)	5.26 (1.31)
E16) Separation of the cash receipts and the cash disbursements functions from the accounts receivable, the billing and the general ledger functions.	5.69 (1.53)	5.11 (2.22)
E17) Customer billing complaints are investigated by persons independent of the accounts receivable and billing functions.	5.22 (1.78)	4.80 (2.11)
E18) Sales invoices and credit memos are sequentially pre-numbered and accounted for regularly.	5.39 (1.39)	4.26** (3.08)*
E19) Prices, terms, extensions, and postings of sales invoices are periodically checked.	5.11 (1.24)	4.40* (2.42)
E20) Cutoff and closing procedures for revenues and accounts receivable are employed at the end of each financial reporting period.	5.72 (1.01)	4.83** (2.91)**
E21) Journal entries crediting accounts receivable for non-cash transactions are approved by an independent executive.	5.19 (1.59)	4.91 (2.02)
E22) Established price lists are available and changes in these prices are approved by responsible officials.	4.64 (1.61)	4.00 (2.18)
E23) Write-offs of uncollectible accounts are approved by an independent executive.	5.14 (1.95)	5.34 (2.47)
E24) Credit memos for goods returned by customers are approved by an independent executive.	5.00 (1.54)	4.80 (2.64)

 Scale: 1 - Not Important, 7 - Very Important.

* Significantly different at .05 level,

** Significantly different at .01 level.

Table 5.4
Mean Ratings of Procedures Related to Analytical Review Risk

		<u>Mean/(Variance)</u>	
		Account	Objective
		Level	Level
		N = 36	N = 35
Procedures			
A1)	Comparison of accounts receivable ending balance to prior years.	4.53 (2.26)	4.74 (2.37)
A2)	Comparison of allowance for doubtful accounts ending balance to prior years.	4.33 (1.89)	4.66 (2.29)
A3)	Comparison of bad debt expense as a percentage of net sales to prior years.	5.22 (1.78)	5.51 (1.73)
A4)	Reviewing relationship between average accounts receivable balance and net sales.	4.94 (1.08)	4.89 (2.10)
A5)	Comparison of accounts receivable turnover to prior years.	5.61 (.93)	5.60 (1.01)
A6)	Comparison of average collection period of accounts receivable to prior years.	5.58 (1.51)	5.86 (.71)*
A7)	Comparison of aging accounts receivable to prior years.	6.11 (1.24)	6.34 (.53)*
A8)	Comparison of current year write-offs to prior year write-offs.	4.81 (1.76)	5.11 (1.63)
A9)	Comparison of current year write-offs to allowance for doubtful accounts.	4.97 (2.48)	4.77 (1.89)
A10)	Comparison of current year write-offs to total accounts receivable balance.	4.72 (2.26)	3.89* (1.93)

Scale: 1 - Not Important, 7 - Very Important.

* Significantly different at .05 level,

** Significantly different at .01 level.

Table 5.5
Mean Ratings of Procedures Related to Tests of Details Risk

Procedures	<u>Mean/(Variance)</u>	
	Account Level N = 36	Objective Level N = 35
D1) Reviewing accounts receivable control account for unusual items.	4.89 (2.44)	5.00 (2.94)
D2) Reviewing accounts receivable for amounts due from related parties, credit balances, and unusual items.	5.39 (1.50)	4.91 (2.20)
D3) Reviewing current year write-offs of accounts receivable.	4.83 (1.74)	4.17* (1.97)
D4) Reviewing collectibility of receivables and determination of adequacy of allowance for doubtful accounts.	6.42 (.76)	6.74 (.31)*
D5) Testing of clerical accuracy. (i.e. footing journals and tracing postings to general ledger and accounts receivable ledger.)	4.69 (1.59)	3.86* (2.42)
D6) Confirmation of accounts receivable using positive confirmations.	6.11 (.84)	5.40* (2.84)**
D7) Confirmation of accounts receivable using negative confirmations.	2.94 (1.54)	2.69 (2.52)
D8) Examination of subsequent collections.	6.22 (.63)	6.06 (1.23)
D9) Examination of evidence related to sales authorizations and shipment of goods.	4.61 (2.24)	4.20 (2.81)
D10) Testing sales cutoff.	5.83 (.83)	4.63** (3.89)**

Scale: 1 - Not Important, 7 - Very Important.

* Significantly different at .05 level,

** Significantly different at .01 level.

Table 5.6
Account Level - Rank Ordering of Risk Cues
Related to Expectations of Errors

Cues		<u>Mean Rankings</u>	
		Account Level	Objective Level
E8)	Number of business failures in industries of client's customers.	1	1
E10)	Experience and competence of client personnel in the relevant departments.	2	5
E20)	Cutoff and closing procedures for revenues and accounts receivable are employed at the end of each financial reporting period.	3	10
E13)	Changes in client's credit policies.	4	2
E16)	Separation of the cash receipts and the cash disbursements functions from the accounts receivable, the billing and the general ledger functions.	5	8
E18)	Sales invoices and credit memos are sequentially pre-numbered and accounted for regularly.	6	18
E7)	Concentration of sales to customers.	7	3
E11)	Client personnel turnover in the relevant departments.	8	13
E17)	Customer billing complaints are investigated by persons independent of the accounts receivable and billing functions.	9	11
E21)	Journal entries crediting accounts receivable for non-cash transactions are approved by an independent executive.	10	9
E15)	Separation of the credit department from the sales department.	11	6
E23)	Write-offs of uncollectible accounts are approved by an independent executive.	12	4

Table 5.6 (cont'd.)

Cues	<u>Mean Rankings</u>	
	Account Level	Objective Level
E19) Prices, terms, extensions, and postings of sales invoices are periodically checked.	13	17
E24) Credit memos for goods returned by customers are approved by an independent executive.	14	12
E14) Automation of the client's accounting system.	15	19
E12) Sales compensation plans.	16	14
E1) Changes in the general economic environment of the client's industry.	17	7
E22) Established price lists are available and changes in these prices are approved by responsible officials.	18	22
E5) Changes in the demand for the clients product.	19	16
E2) Number of business failures within the client's industry.	20	15
E6) Dependency of customers on client's products.	21	20
E3) Changes in the client's position within the industry.	22	21
E4) Level of competition in the client's industry.	23	24
E9) Domination of the client's top, executive management by one or a few individuals.	24	23

Table 5.7
Objective Level - Rank Ordering of Risk Cues
Related to Expectations of Errors

Cues		<u>Mean Rankings</u>	
		Account Level	Objective Level
E8)	Number of business failures in industries of client's customers.	1	1
E13)	Changes in client's credit policies.	4	2
E7)	Concentration of sales to customers.	7	3
E23)	Write-offs of uncollectible accounts are approved by an independent executive.	12	4
E10)	Experience and competence of client personnel in the relevant departments.	2	5
E15)	Separation of the credit department from the sales department.	11	6
E1)	Changes in the general economic environment of the client's industry.	17	7
E16)	Separation of the cash receipts and the cash disbursements functions from the accounts receivable, the billing and the general ledger functions.	5	8
E21)	Journal entries crediting accounts receivable for non-cash transactions are approved by an independent executive.	10	9
E20)	Cutoff and closing procedures for revenues and accounts receivable are employed at the end of each financial reporting period.	3	10
E17)	Customer billing complaints are investigated by persons independent of the accounts receivable and billing functions.	9	11
E24)	Credit memos for goods returned by customers are approved by an independent executive.	14	12

Table 5.7 (cont'd.)

Attributes	<u>Mean Rankings</u>	
	Account Level	Objective Level
E11) Client personnel turnover in the relevant departments.	8	13
E12) Sales compensation plans.	16	14
E2) Number of business failures within the client's industry.	20	15
E5) Changes in the demand for the clients product.	19	16
E19) Prices, terms, extensions, and postings of sales invoices are periodically checked.	13	17
E18) Sales invoices and credit memos are sequentially pre-numbered and accounted for regularly.	6	18
E14) Automation of the client's accounting system.	15	19
E6) Dependency of customers on client's products.	21	20
E3) Changes in the client's position within the industry.	22	21
E22) Established price lists are available and changes in these prices are approved by responsible officials.	18	22
E9) Domination of the client's top, executive management by one or a few individuals.	24	23
E4) Level of competition in the client's industry.	23	24

Table 5.8
Account Level - Rank Ordering of Procedures
Related to Analytical Review Risk

Procedures		<u>Mean Rankings</u>	
		Account Level	Objective Level
A7)	Comparison of aging accounts receivable to prior years.	1	1
A5)	Comparison of accounts receivable turnover to prior years.	2	3
A6)	Comparison of average collection period of accounts receivable to prior years.	3	2
A3)	Comparison of bad debt expense as a percentage of net sales to prior years.	4	4
A9)	Comparison of current year write-offs to allowance for doubtful accounts.	5	7
A4)	Reviewing relationship between average accounts receivable balance and net sales.	6	6
A8)	Comparison of current year write-offs to prior year write-offs.	7	5
A10)	Comparison of current year write-offs to total accounts receivable balance.	8	10
A1)	Comparison of accounts receivable ending balance to prior years.	9	8
A2)	Comparison of allowance for doubtful accounts ending balance to prior years.	10	9

Table 5.9
Objective Level - Rank Ordering of Procedures
Related to Analytical Review Risk

Procedures		<u>Mean Rankings</u>	
		Account Level	Objective Level
A7)	Comparison of aging accounts receivable to prior years.	1	1
A6)	Comparison of average collection period of accounts receivable to prior years.	3	2
A5)	Comparison of accounts receivable turnover to prior years.	2	3
A3)	Comparison of bad debt expense as a percentage of net sales to prior years.	4	4
A8)	Comparison of current year write-offs to prior year write-offs.	7	5
A4)	Reviewing relationship between average accounts receivable balance and net sales.	6	6
A9)	Comparison of current year write-offs to allowance for doubtful accounts.	5	7
A1)	Comparison of accounts receivable ending balance to prior years.	9	8
A2)	Comparison of allowance for doubtful accounts ending balance to prior years.	10	9
A10)	Comparison of current year write-offs to total accounts receivable balance.	8	10

Table 5.10
Account Level - Rank Ordering of Procedures
Related to Tests of Details Risk

Procedures		<u>Mean Rankings</u>	
		Account Level	Objective Level
D4)	Reviewing collectibility of receivables and determination of adequacy of allowance for doubtful accounts.	1	1
D8)	Examination of subsequent collections.	2	2
D6)	Confirmation of accounts receivable using positive confirmations.	3	3
D10)	Testing sales cutoff.	4	6
D2)	Reviewing accounts receivable for amounts due from related parties, credit balances, and unusual items.	5	5
D1)	Reviewing accounts receivable control account for unusual items.	6	4
D3)	Reviewing current year write-offs of accounts receivable.	7	8
D5)	Testing of clerical accuracy. (i.e. footing journals and tracing postings to general ledger and accounts receivable ledger.)	8	9
D9)	Examination of evidence related to sales authorizations and shipment of goods.	9	7
D7)	Confirmation of accounts receivable using negative confirmations.	10	10

Table 5.11
Objective Level - Rank Ordering of Procedures
Related to Tests of Details Risk

Procedures	<u>Mean Rankings</u>	
	Account Level	Objective Level
D4) Reviewing collectibility of receivables and determination of adequacy of allowance for doubtful accounts.	1	1
D8) Examination of subsequent collections.	2	2
D6) Confirmation of accounts receivable using positive confirmations.	3	3
D1) Reviewing accounts receivable control account for unusual items.	6	4
D2) Reviewing accounts receivable for amounts due from related parties, credit balances, and unusual items.	5	5
D10) Testing sales cutoff.	4	6
D9) Examination of evidence related to sales authorizations and shipment of goods.	9	7
D3) Reviewing current year write-offs of accounts receivable.	7	8
D5) Testing of clerical accuracy. (i.e. footing journals and tracing postings to general ledger and accounts receivable ledger.)	8	9
D7) Confirmation of accounts receivable using negative confirmations.	10	10

While Tables 5.3 through 5.11 give some reflection of the relative importance of risk component cues, they do not adequately demonstrate the variability of these ratings. Figures 5.1 through 5.6 present the mean rating for each risk component cue plotted against its variance. Dividing the figures into four quadrants provides a basis for evaluating the variability of risk component cues. Risk component cues in the upper left hand quadrant of the figure reflect items which are very important and have a high level of agreement across auditors. Risk component cues in the lower right hand quadrant of the figure reflect items which are less important and have a high level of disagreement across auditors. Risk component cues in the lower left hand quadrant of the figure reflect items which are less important and have a high level of agreement across auditors. Finally, risk component cues in the upper right hand quadrant of the figure reflect items which are important but have a high level of disagreement across auditors.

Table 5.6 and Figure 5.1 present the relative rankings of the expectations of errors risk cues evaluated with respect to accounts receivable. Table 5.7 and Figure 5.2 present the relative rankings of the expectations of errors risk cues evaluated with respect to the valuation of accounts receivable. The risk cues selected for manipulation in the second experiment were as follows:

- E8 - Number of business failures in industries of client's customers.
- E13 - Changes in clients' credit policies.

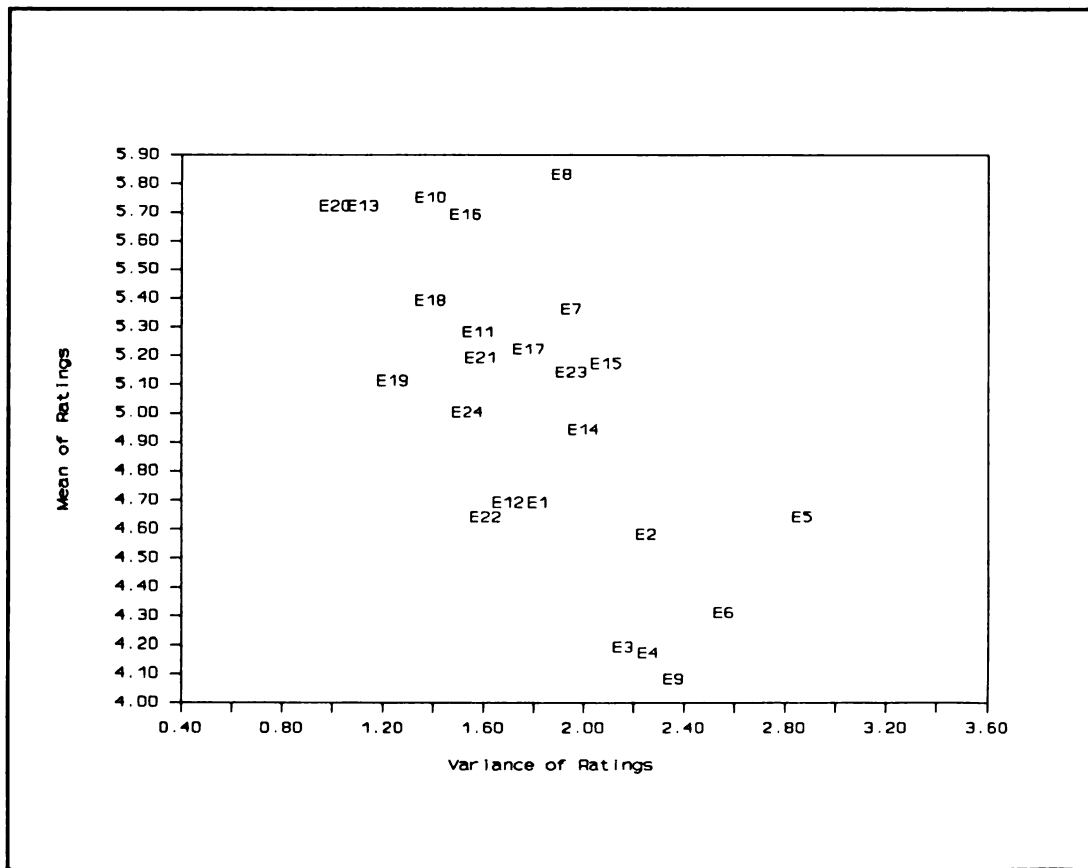


Figure 5.1
Account Level - Plot of Participant Ratings for
Expectations of Errors

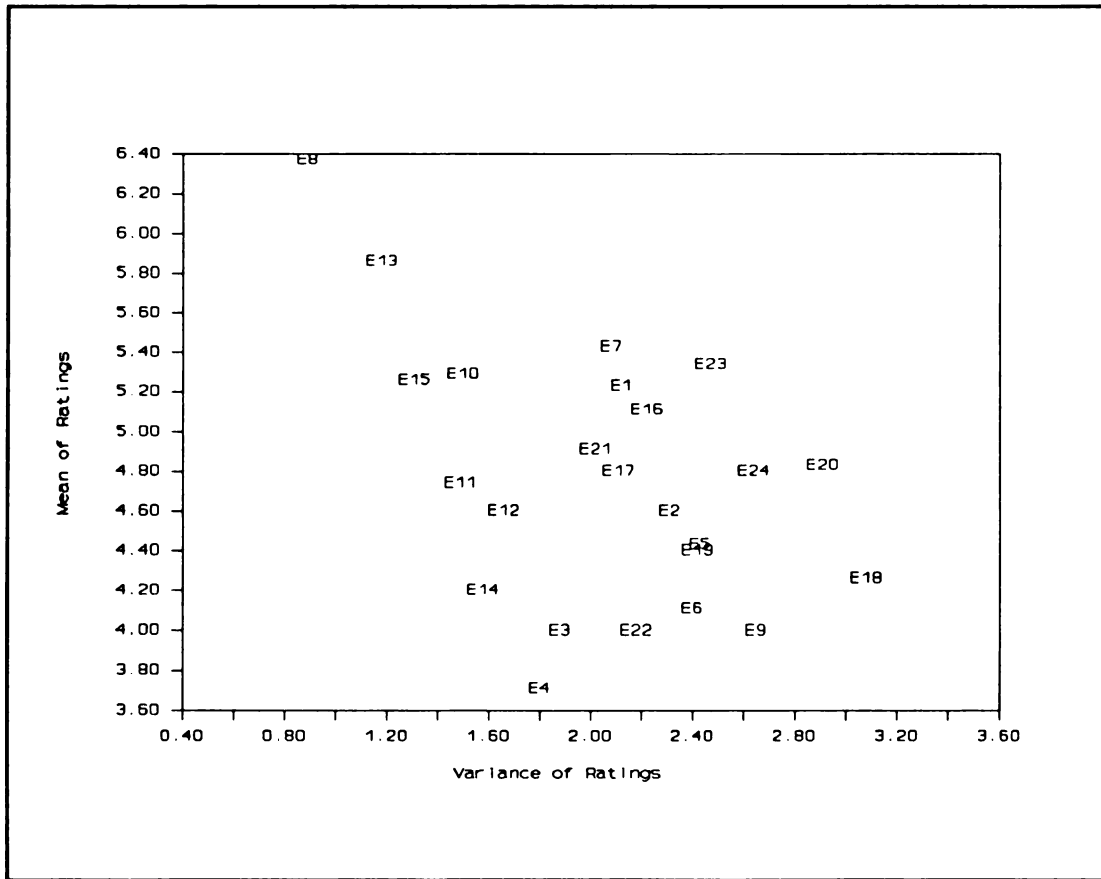


Figure 5.2
Objective Level - Plot of Participant Ratings for
Expectations of Errors

The same manipulation was used for both the account and audit objective level instruments to enhance comparisons across the two treatment groups. E8 and E13 were selected over the other risk cues because there was a high level of agreement across auditors and they related to the valuation objective. Risk cues relating to the valuation objective consistently had high ratings and low variances across expectations of errors, analytical review risk and tests of details risk¹². Selecting risk cues relating to the same audit objective for all three risk components will eliminate one possible source of confounding in the results. Selecting risk cues relating to different audit objectives would require auditors to not only integrate their assessments of the three risk components but also aggregate their assessments across audit objectives.

Table 5.8 and Figure 5.3 present the relative rankings of the analytical review risk cues evaluated with respect to accounts receivable. Table 5.9 and Figure 5.4 present the relative rankings of the analytical review risk cues evaluated with respect to the valuation of accounts receivable. The risk cues selected for manipulation in the second experiment were as follows:

- A7 - Comparison of aging accounts receivable to prior years.
- A6 - Comparison of average collection period of accounts receivable to prior years.

¹² Further support for the use of the valuation objective is given by Sullivan [1988] who notes that the valuation objective, which involves management judgment applied to financial data after they have been processed by the accounting system, often represent relatively high risks to the auditor.

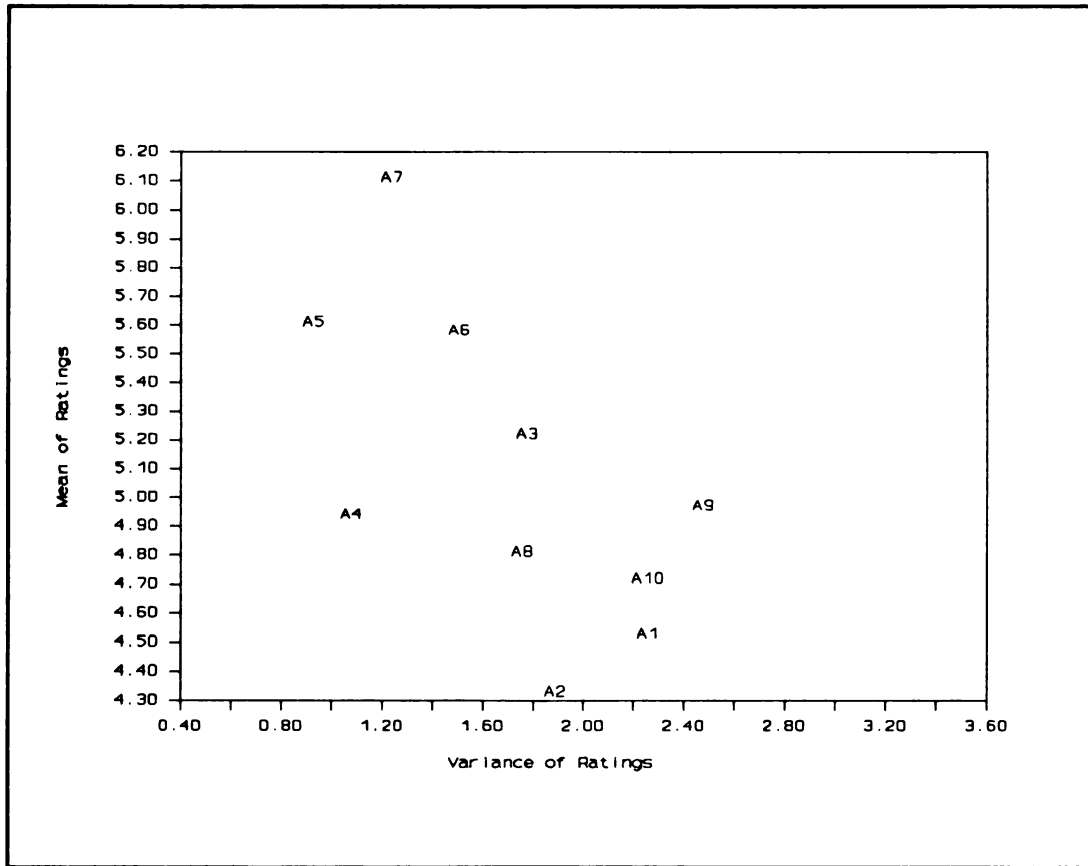


Figure 5.3
Account Level - Plot of Participant Ratings for
Analytical Review Risk

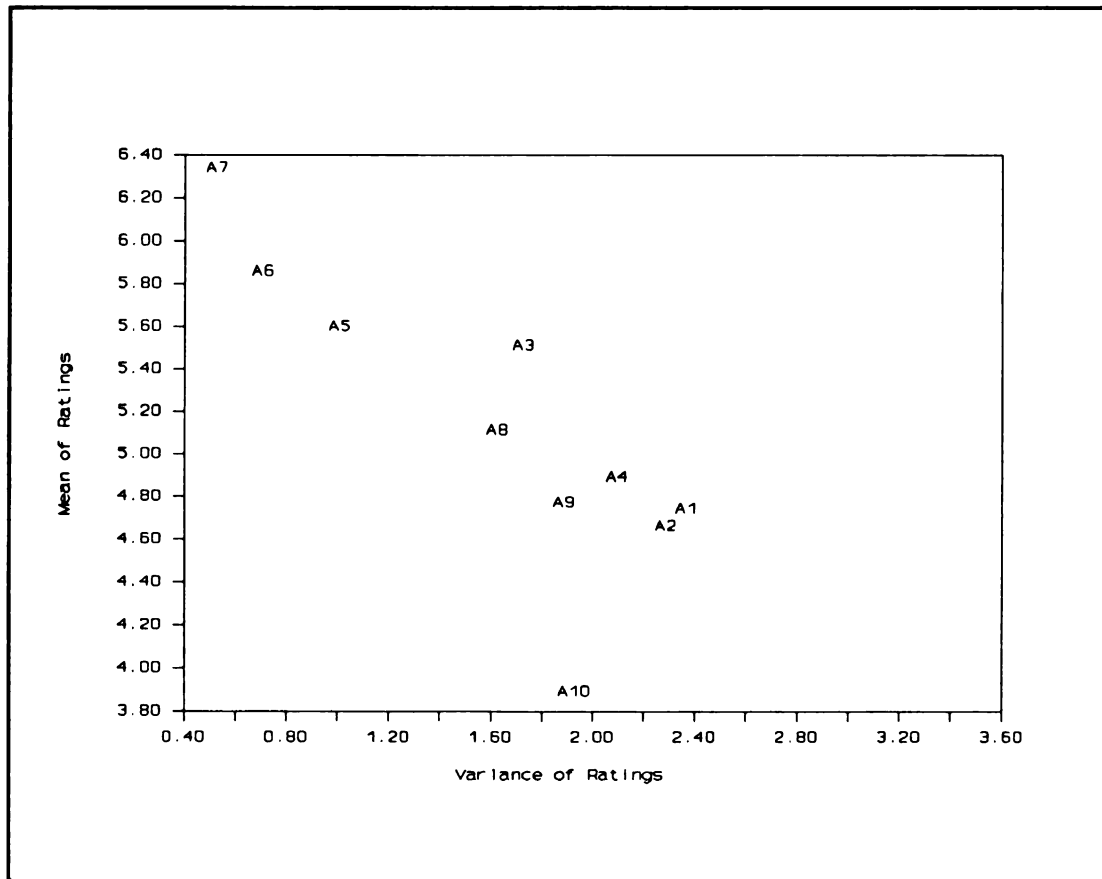


Figure 5.4
Objective Level - Plot of Participant Ratings for
Analytical Review Risk

Risk cues A7 and A6 were selected for manipulation in the second experiment as there was high agreement across auditors and they related to the valuation objective.

Table 5.10 and Figure 5.5 present the relative rankings of the tests of details risk cues evaluated with respect to accounts receivable. Table 5.11 and Figure 5.6 present the relative rankings of the tests of details risk cues evaluated with respect to the valuation of accounts receivable. The risk cues selected for manipulation in the second experiment were as follows:

- D4 - Reviewing collectibility of receivables and determination of adequacy of allowance for doubtful accounts.
- D8 - Examination of subsequent collections.

Risk cues D4 and D8 were selected for manipulation in the second experiment as there was high agreement across auditors and they related to the valuation objective.

The goal of the above analysis was to determine the relative importance of the various risk component cues. The results indicate that many cues are considered by auditors when evaluating the respective risk components. Moreover, the results indicate the relative importance of various risk cues in auditors' risk assessments. The results show auditors' risk assessments are differentially affected by the various risk cues. The relative rankings of risk cues derived from this study will be beneficial to both practitioners and researchers. The rankings will help practitioners develop checklists or other types of audit decision aids. Inexperienced auditors could use these checklists or decisions aids to insure that all critical issues are addressed. Additionally, checklists or decision aids would

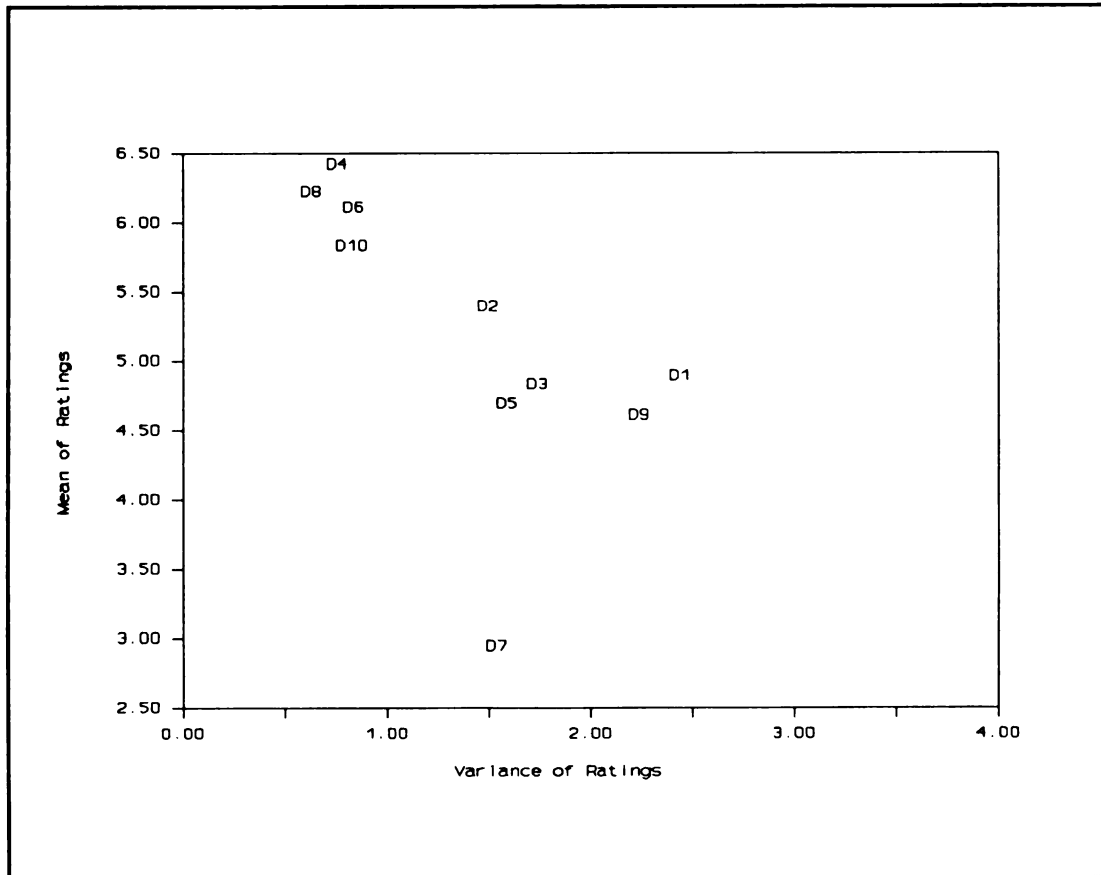


Figure 5.5
Account Level - Plot of Participant Ratings for
Tests of Details Risk

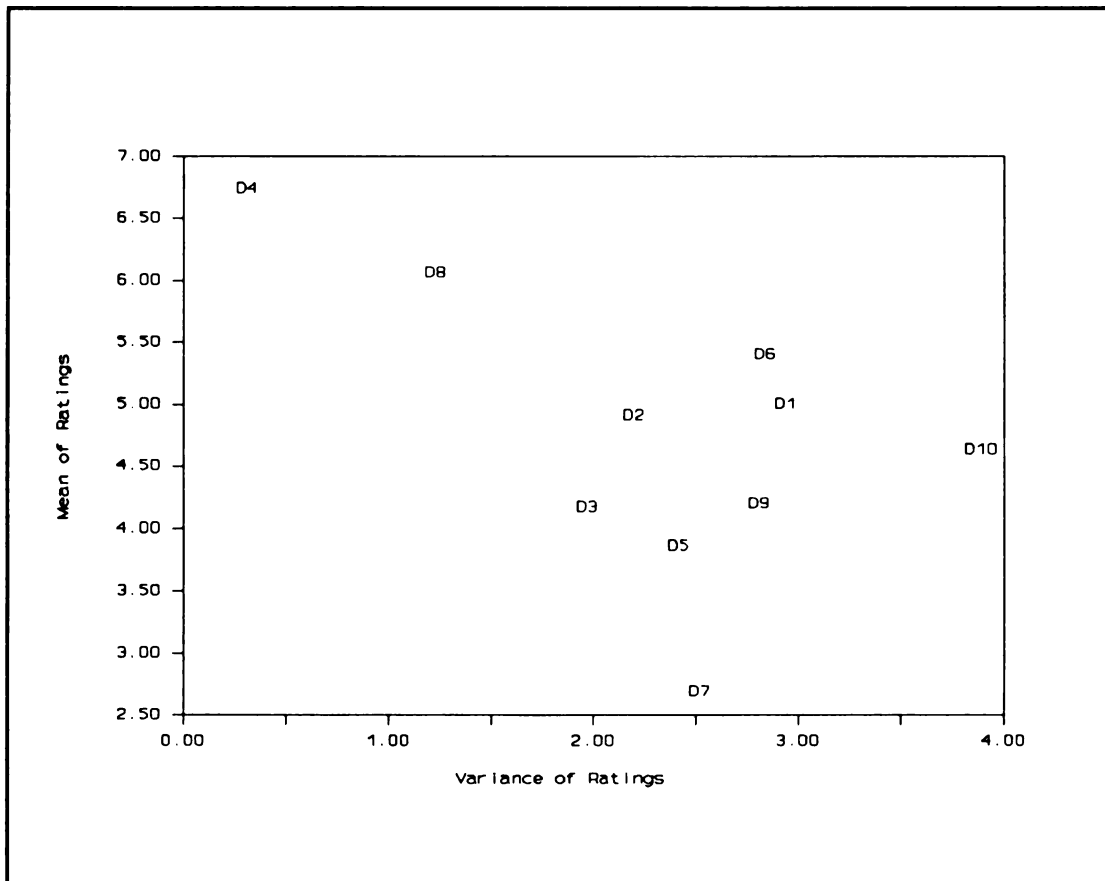


Figure 5.6
Objective Level - Plot of Participant Ratings for
Tests of Details Risk

enable inexperienced auditors to focus readily on the most important cues. The rankings will be useful to researchers concerned with investigating the assessment of audit risk. The relative rankings could be used in a manner similar to the way they were used by the current study.

Two additional points are worth noting from the above analysis. First, the results signify that care must be exercised when interpreting prior research efforts. The relative rankings of risk cues obtained by the current study do not agree with the relative rankings obtained by prior studies. For example, the discussion in the literature review noted a study which found personnel related problems to have relatively low importance ratings. This finding conflicted with the results of Hylas and Ashton [1982] and others, who found personnel problems to be one of the primary causes of error. Contrary to the prior study the current study found personnel related problems to have relatively high importance ratings. One possible explanation for these conflicting results is the level of aggregation in which participants were required to make their assessments. The prior study required auditors to evaluate risk cues at a general audit client level. The current study required auditors to evaluate risk cues at both an account and audit objective level. The judgment task should be an important consideration when interpreting prior research efforts.

Second, the results indicate that auditors do consider inherent risk cues when evaluating audit risk. SAS No. 39 [1981] implicitly set inherent risk equal to one as it was felt that assessment of such a risk would be difficult and potentially costly to quantify. SAS No. 47

[1983] subsequently incorporated inherent risk explicitly into the audit risk model. The current results support the explicit inclusion of inherent risk into the audit risk model. The results indicate that auditors believe the benefits for considering inherent risk to outweigh the costs. This concludes the discussion of the analysis pertaining to research question five.

5.1.2 Effect of Judgment Task

Research question three was concerned with the effect of the judgment task (account/audit objective level) on auditors' evaluations. MANOVA techniques were used to test the equality of the dependent mean vectors (or centroids) across the treatment groups.

Table 5.12
MANOVA Aggregation Level Summary Table

Risk Component	Wilks' Lambda	Degrees of Freedom	F Statistic
Expectations of Errors	.60	24, 46	1.28
Analytical Review Risk	.79	10, 60	1.56
Tests of Details Risk	.69	10, 60	2.67**

** p < .01.

Table 5.12 presents the results from the MANOVA analysis. Included in this table is the Wilks' lambda, the degrees of freedom associated with the F-statistic, the F-statistic and level of significance. Wilks' lambda equals the ratio of the determinant of the within groups sum of squares and cross products to the determinant of the total groups sum of squares and cross products. The determinant of

the sum of squares and cross products matrix represents the generalized variance¹³. The smaller the value of Wilks' lambda the greater the difference between the group centroids. The value of the determinant of the within groups sum of squares and cross products becomes smaller relative to the determinant of the total groups sum of squares and cross products when the variance among the group centroids is relatively larger than the variance within the groups (Hair et al., 1984).

Research hypothesis three (H_3) stated that the judgment task would affect auditor evaluations. In statistical terms H_3 was tested by examining the dependent mean vectors (or centroids) for differences between the account level and audit objective level groups. A separate MANOVA analysis was performed for each of the three risk components. Contrary to expectations the MANOVA tests indicated that the treatment groups dependent mean vectors (or centroids) were equal for two of the three risk components. A significant difference was found for tests of details risk. Nonsignificant differences were found for expectations of errors and analytical review risk.

One explanation for the nonsignificant results could be the influence of extraneous third variables. Prior studies have found that variables such as firm affiliation, audit experience, client practice and audit approach affect auditor judgments (see literature review). One way to control for these extraneous third variables is to use multivariate analysis of covariance techniques (MANCOVA). MANCOVA

¹³ - The generalized variance is analogous to the mean square error in ANOVA.

permits the post hoc experimental control of one or more extraneous third variables by removing their influence on the main treatment variable. MANOCOVA improves the precision of an experiment by removing possible sources of variance in the criterion variable that were not controlled by the experimental design. Removing the influences of these extraneous third variables reduces the residual error thereby increasing the pure effect of the treatment variable (Hair et al., 1984).

Table 5.13
MANOCOVA Aggregation Level Summary Table[#]

Risk Component	Wilks' Lambda	Degrees of Freedom	F Statistic
Expectations of Errors	.45	24, 38	1.96*
Analytical Review Risk	.74	10, 52	1.80
Tests of Details Risk	.63	10, 52	3.10**

* $p < .05$,

** $p < .01$.

The covariates were firm affiliation, years of auditing experience, percentage of manufacturing clients and audit approach.

Table 5.13 presents the results from the MANOCOVA analysis using firm affiliation, years of auditing experience, percentage of manufacturing clients and audit approach as the covariates. A separate MANOCOVA analysis was performed for each of the three risk components. Significant differences were found between the two treatment groups for expectations of errors and tests of details risk. A nonsignificant difference was found for analytical review risk.

Caution should be exercised when interpreting MANOVA/MANOCOVA significance tests. In general, MANOVA/MANOCOVA constructs a linear combination of the dependent variables which maximizes the ratio of the between group generalized variance to the within group generalized variance. Dependent variables with the largest differences across treatment groups are given the highest weights in the linear equation. This technique increases the probability of finding group differences by capitalizing on chance. Univariate t-tests were computed for each risk cue to determine the reasonableness of the MANOCOVA significance tests. Risk cues relating directly to the valuation objective should have higher mean ratings for the audit objective level group as compared to the account level group¹⁴ while, risk cues relating to other audit objectives or multiple audit objectives should have higher mean ratings for the account level group. Tables 5.4 through 5.6 present the mean ratings for each risk cue. The relative ratings of the two treatment groups are consistent with the a priori reasoning. Mean ratings for risk cues relating primarily to the valuation objective were higher for participants in the audit objective level group as compared to participants in the account level group while, mean ratings for risk cues relating to other audit objectives or multiple audit objectives were lower for participants in the audit objective level group as compared to participants in the account level group. Nine out of a total of forty four risk cues were statistically different for the two treatment groups. The risk cues which were significantly different

¹⁴ The valuation objective is one of several audit objectives which comprises the overall risk assessment for an account.

across the two treatment groups, related to audit objectives other than the valuation objective or multiple audit objectives. In all cases the mean ratings were higher for the account level group as compared to the audit objective level group.

Risk cues were partitioned into three groups to further examine the effect of the judgment task on auditor evaluations. Risk cues were classified as to those relating primarily to the valuation objective, those relating to the valuation objective and other audit objectives and those relating to other audit objectives. A new summary variable was computed for each risk cue classification. The summary variable was computed by summing each participants importance assessments for the risk cues classified in that group and dividing by the total number of risk cues included in that group. Table 5.14 presents the results of the new summary variables. The account level group summary variables for risk cues relating to audit objectives other than the valuation objective were higher and significantly different for expectations of errors and tests of details risk. Additionally, the account level group summary variable for risk cues relating to the valuation and other audit objectives was higher and significantly different for tests of details risk. In all cases the differences between the summary variables of the two treatment groups were in the expected direction.

The general high mean ratings of risk cues relating to the valuation objective along with the nonsignificant differences of these cues across the two treatment groups suggests that the valuation objective is a very important audit objective with respect to accounts

Table 5.14
Mean Ratings of Summary Risk Cue Variables

Summary Variable	Account Level	Objective Level
<u>Expectations of Errors Summary Variables</u>		
Risk Cues Relating Primarily to the Valuation Objective (E8, E13, E15)	5.57	5.83
Risk Cues Relating to the Valuation and Other Audit Objectives (E1, E2, E3, E4, E5, E6, E7, E9, E10, E11, E12, E16, E17, E19, E21, E22, E23)	4.87	4.63
Risk Cues Relating to Other Audit Objectives (E14, E18, E20, E24)	5.26	4.52**
<u>Analytical Review Summary Variables</u>		
Procedures Relating Primarily to the Valuation Objective (A2, A3, A7)	5.22	5.50
Procedures Relating to the Valuation and Other Audit Objectives (A1, A4, A5, A6, A8, A9, A10)	5.02	4.98
<u>Tests of Details Summary Variables</u>		
Procedures Relating Primarily to the Valuation Objective (D4)	6.42	6.74
Procedures Relating to the Valuation and Other Audit Objectives (D1, D3, D5, D6, D7, D8)	4.95	4.53*
Procedures Relating to Other Audit Objectives (D2, D9, D10)	5.28	4.58*

 Scale: 1 - Not Important, 7 - Very Important.

* Significantly different at .05 level,

** Significantly different at .01 level.

receivable. The above argument is consistent with Sullivan [1988], who notes that the valuation objective often represents high risks to auditors.

The general agreement of the mean ratings and rankings of analytical review procedures could have occurred because of the nature of analytical review procedures in combination with the overall importance of the valuation objective. The valuation objective is one of several audit objectives which comprises the overall risk assessment for an account. Sullivan [1988] notes that analytical review procedures provide evidence about all audit objectives related to an account balance. Given the universal nature of analytical review procedures along with the relative importance of the valuation objective it would be reasonable to expect the mean ratings to be similar across the two treatment groups.

The results above suggest that the judgment task does affect auditors' judgments. The relative weights assigned to risk cues differ across the two judgment tasks. The current study signifies the care that must be exercised when interpreting and designing research efforts. If the objective of a research project is to obtain a better understanding of audit practice the researcher must be very careful to construct a task which is representative of the actual judgment task. Otherwise extreme care must be exercised in interpreting the results. While the aggregation level employed by the current study is representative of the auditors actual judgment task the decision required of the auditors was not. The second experiment examined this

issue employing a more representative decision task. This concludes the discussion of the analysis pertaining to H_3 .

5.1.3 Consensus of Auditors

Research question four was concerned with the effect of the judgment task (account level/audit objective level) on auditor consensus. The mean correlation coefficient was used to address this research question. Research hypothesis four (H_4) stated that consensus would be higher for the audit objective level group as compared to the account level group. In statistical terms this meant that the audit objective level group should have higher mean correlations than the account level group.

Tables 5.15 and 5.16 present the mean correlation coefficients for each risk component. The mean correlation coefficients were higher at the audit objective level for expectations of errors and analytical review risk. These differences were found to be significantly different using both the Kruskal Wallis nonparametric ANOVA and ANOVA. A significant difference was not found for tests of details risk.

The results provide support for the research hypothesis that the mean correlation (consensus) is greater for the audit objective level evaluation as compared to the account level evaluation. Consensus was lower for the more complex account level evaluation as compared to the less complex audit objective level evaluation. As the task's cognitive strain was reduced agreement across auditors increased. The results obtained above were preliminary. While the aggregation level employed by the current study is representative of the auditors actual judgment

Table 5.15
Mean Pearson Correlation Coefficient
Across Participants

Risk Component	Account Level r	Objective Level r
Expectations of Errors	.151	.186*
Analytical Review Risk	.170	.276**
Tests of Details Risk	.497	.473

* p < .05,		
** p < .01.		

Table 5.16
Mean Spearman Rank Correlation Coefficient
Across Participants

Risk Component	Account Level r	Objective Level r
Expectations of Errors	.153	.191*
Analytical Review Risk	.176	.256**
Tests of Details Risk	.465	.467

* p < .05,		
** p < .01.		

task the decision required of the auditors was not. The second experiment examined the consensus issue employing a more representative decision task. This concludes the discussion of the analysis pertaining to H_4 .

5.1.4 Analysis of Debriefing Information

The purpose of this section is to establish the equality of the auditors assigned to the two treatment groups. Approximately half of the participants were asked to evaluate risk cues with respect to a specific account while the other half were asked to evaluate risk cues with respect to a specific audit objective within the account. A formal random design was not used to assign participants to the two treatment groups. This does not imply that two non-random samples were obtained by the current study. Non-random designs increase the possibility of having systematic differences between treatment groups. This analysis provides background for the detailed analysis of the participant responses presented in the previous subsections.

Demographic information was collected on the participants background as auditors. The demographic information collected was determined based on a review of prior research and pilot tests. Prior auditing studies have found variables such as firm affiliation, audit experience, client practice and audit approach to affect auditor judgments. Therefore, it was important that the treatment groups were homogeneous across these variables. Table 5.17 presents the demographic information across the treatment groups. MANOVA and univariate t-tests were used to test for differences between the two

Table 5.17
Experiment I Demographic Information Across Instruments (N = 71)

	Account Level	Objective Level
Mean age of participants	32.1	30.8
Mean number of years of business experience	10.2	9.2
Mean number of years of auditing experience	8.5	8.3
Mean number of years of public accounting experience	8.7	8.4
Mean number of years of Big Eight accounting experience	8.2	7.6
Percentage of participants with CPA certificate	97.2%	97.1%
Percentage of participants with under graduate accounting degree	86.1%	74.3%
Percentage of participants with graduate degree	27.8%	20.0%
Percentage of participants who were partners	2.8%	0.0%
Percentage of participants who were managers	88.9%	88.6%
Percentage of participants who were supervisors	8.3%	8.6%
Percentage of participants who were seniors	0.0%	2.9%
Mean number of years at present job title	3.0	2.7

Table 5.17 (cont'd.)

	Account Level	Objective Level
Mean percentage of audit time spent on manufacturing clients	41.1%	42.8%
Mean percentage of audit time spent on clients where a control reliance approach is used	40.5%	44.9%
Mean interest in task (1 = Of no interest, 4 = Very interesting)	2.9	2.9
Mean number of minutes to complete task	80.1	72.1

treatment groups. Neither MANOVA nor univariate t-tests found significant differences in the demographic variables between the two treatment groups. The demographic variables were, neither individually nor collectively, significantly different across the two treatment groups. The results demonstrate that the treatment groups do not differ with respect to the demographic variables.

5.2 Experiment II results

This section discusses the results of the second experiment. The purpose of this experiment was to model auditors' subjective assessment of audit risk and to examine the effect of the judgment task on auditor risk assessments. Research questions one through four were addressed by the second experiment. Research question one was concerned with determining the composition rule followed by auditors. Research question two was concerned with determining the weights assigned to the risk component factors. Research question three was concerned with determining the effect of the judgment task on auditor risk assessments. Research question four was concerned with determining the effect of the judgment task on auditor consensus. The current section is organized around the four research questions. The first subsection contains a discussion of the results obtained with respect to research hypothesis one (H_1). Subsection two contains a discussion of the results obtained with respect to research hypothesis two (H_2). Subsection three contains a discussion of the results obtained with respect to research hypothesis three (H_3). Subsection four contains a discussion of the results obtained with respect to research hypothesis

four (H_4). The final subsection contains an analysis of the debriefing information.

5.2.1 Modeling Audit Risk

Research question one was concerned with determining the composition rule followed by auditors when subjectively evaluating audit risk. ANOVA techniques were used to ascertain the model followed by auditor participants. The dependent variable for this analysis was the auditors' subjective assessments of audit risk. The independent variables for this analysis were the manipulations to expectations of errors, analytical review risk and tests of details risk. A separate analysis was conducted for the group of auditors who evaluated the cases with respect to accounts receivable and the group of auditors who evaluated the cases with respect to the valuation of accounts receivable.

The second instrument was constructed such that the two anchor cases (low expectations of errors, low analytical review risk and low tests of details risk case and high expectations of errors, high analytical review risk and high tests of details risk case) were clearly identifiable as the endpoints. Accordingly, it is reasonable to expect that auditors exercising due care should be able to identify the anchors as having the lowest and highest audit risk respectively. The relative rankings of the anchor cases were examined to determine whether participants exercised due care while completing the case studies. Eighty three percent of the participants completing the account level instrument correctly ranked the anchors as having the

highest and lowest audit risk respectively. Eighty seven percent of the participants completing the objective level instrument correctly ranked the endpoints as having the highest and lowest audit risk respectively. Participants who did not rank the endpoints as having the lowest or highest audit risk respectively, did rank the endpoints as having the second to lowest or second to highest audit risk respectively. The results indicate that participants exercised due care while completing the case studies.

In addition to the validity check above, a manipulation check was performed to determine whether participants did attend to the manipulations to expectations of errors, analytical review risk and tests of details risk. The participants were asked to make assessments for expectations of errors, analytical review risk and tests of details risk. Each assessment was used as an dependent variable. The independent variables were the manipulations to expectations of errors, analytical review risk and tests of details risk. ANOVA techniques were used to test for differences between the high and low manipulations. Significant differences were found for all three risk components demonstrating that the manipulations were attended to by the participants.

Repeated measures factorial designs are satisfactory from an internal validity perspective but have potential problems from an external validity perspective. Participant responses could be biased by the order in which the cases are presented. To control for this problem, four different case orderings were used. ANOVA techniques were used to test for an order effect. The dependent variable for this

analysis was the participants' assessments of audit risk. The independent variable for this analysis was the ordering of the cases. The case ordering main effect was not significant for either the account level or audit objective level instrument. The only significant interaction effect was the expectations of errors by analytical review risk by tests of details risk by order interaction for the account level group. The omega squared for this interaction was .002. Omega squared varies between zero and one with zero signifying no treatment effect. The omega squared indicates that the relative treatment magnitude of this effect is very small and not important. The above results indicate that case order did not play a major role in the auditors' subjective assessments of audit risk.

Table 5.18 presents cell means and standard deviations for the auditors' subjective assessments of audit risk. The audit risk scale ranged from 1 - Low to 9 - High. Hartley's $F_{\max}$ was computed to test for heterogeneity of variance. This analysis was conducted separately for the group of auditors assigned to the account level assessment and the group of auditors assigned to the audit objective level assessment. No significant differences were found between the cell variances for either group. Table 5.19 and 5.20 present the repeated measures ANOVA summary table for the group assigned to the account level assessment and the group assigned to the audit objective level assessment.

Table 5.18
Means and Standard Deviations by Treatment Cell

		Account level EXPECTATIONS OF ERRORS			
		High ANALYTICAL REVIEW		Low ANALYTICAL REVIEW	
		High	Low	High	Low
T E S T S O F D E T A I L	High	6.03 (1.96)	5.27 (2.00)	4.93 (2.02)	3.97 (1.85)
	Low	4.87 (2.26)	4.07 (2.30)	4.03 (1.90)	3.03 (1.79)

		Objective level EXPECTATIONS OF ERRORS			
		High ANALYTICAL REVIEW		Low ANALYTICAL REVIEW	
		High	Low	High	Low
T E S T S O F D E T A I L	High	6.23 (1.69)	5.39 (1.80)	4.52 (1.39)	3.81 (1.45)
	Low	5.00 (1.88)	4.42 (2.13)	3.39 (1.36)	2.87 (1.45)

Scale: 1 - Low Risk, 9 - High Risk.

Table 5.19
Account Level - ANOVA Summary Table

Source	Sum of Squares	DF	Mean Square	F	Pr > F
Expectations of Errors (EE)	68.27	1	68.27	22.37	.0001
Analytical Review Risk (ARR)	46.82	1	46.82	36.27	.0001
Tests of Details Risk (TDR)	66.15	1	66.15	48.44	.0001
EE x ARR	.60	1	.60	1.05	.3151
EE x TDR	1.07	1	1.07	.95	.3387
ARR x TDR	.02	1	.02	.07	.7978
EE x ARR x TDR	.00	1	.00	.00	1.000

Table 5.20
Objective Level - ANOVA Summary Table

Source	Sum of Squares	DF	Mean Square	F	Pr > F
Expectations of Errors (EE)	161.29	1	161.29	74.49	.0001
Analytical Review Risk (ARR)	27.11	1	27.11	19.77	.0001
Tests of Details Risk (TDR)	70.26	1	70.26	40.15	.0001
EE x ARR	.15	1	.15	.28	.6012
EE x TDR	.06	1	.06	.10	.7530
ARR x TDR	.79	1	.79	2.80	.1045
EE x ARR x TDR	.02	1	.02	.05	.8251

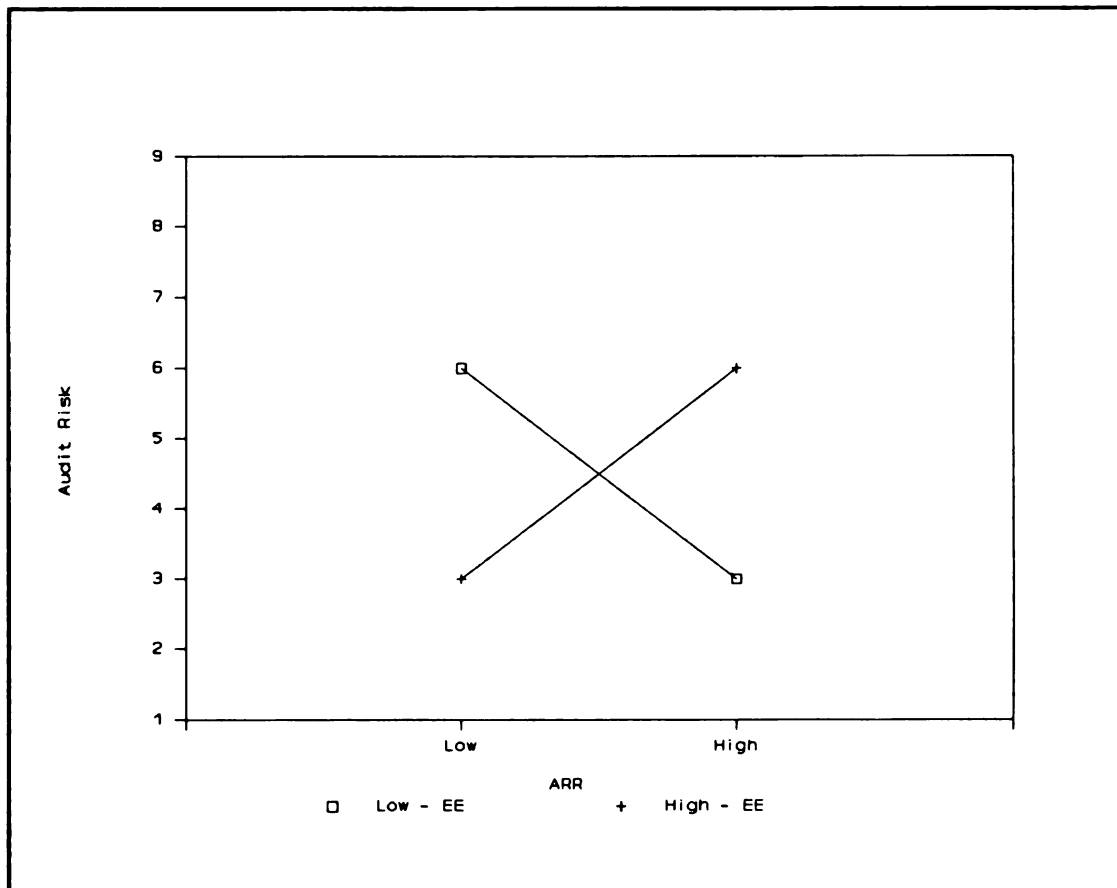


Figure 5.7
Graph of Disordinal Two-Way Interaction

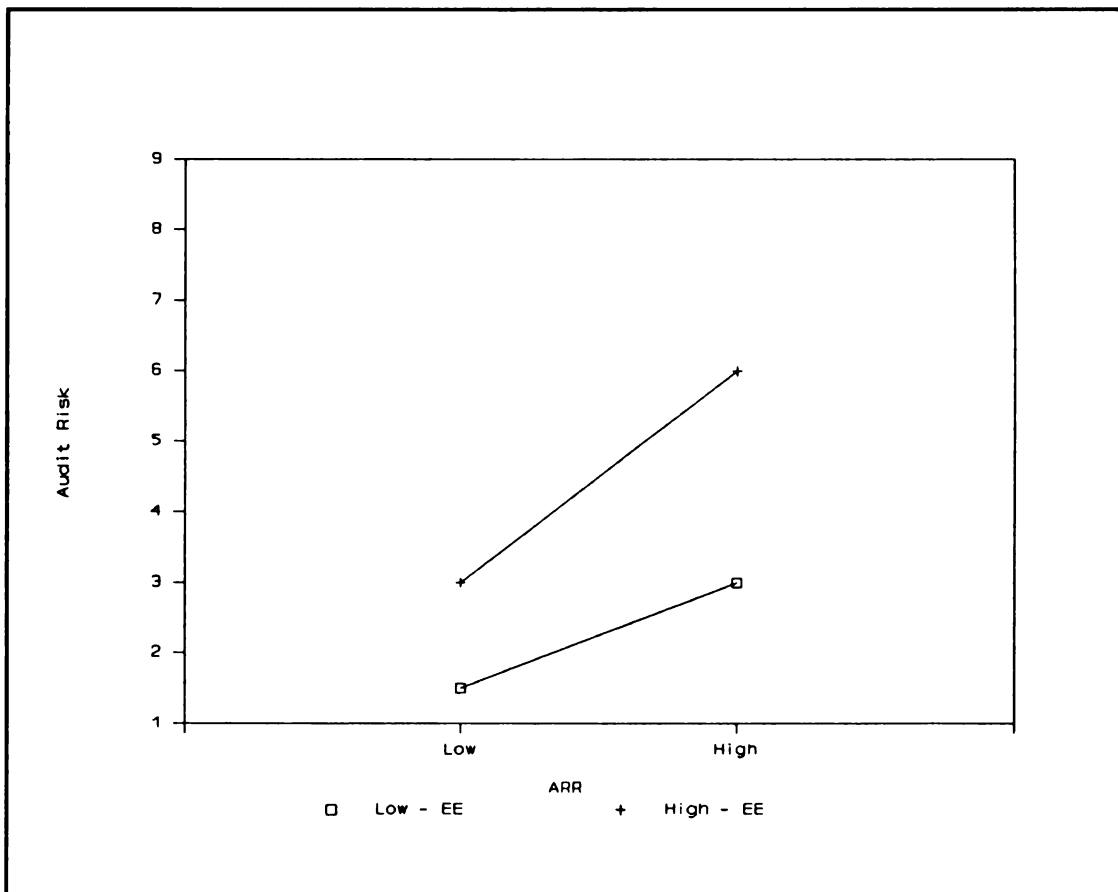


Figure 5.8
Graph of Multiplicative Two-Way Interaction

The null hypothesis for H_1 was that auditors follow an additive composition rule for expectations of errors, analytical review risk and tests of details risk. An additive composition rule is reflected by significant main effects and nonsignificant interactions. A preliminary review of Table 5.19 and 5.20 indicates that the auditors are following an additive composition rule.

The interaction effects tested by the standard ANOVA analysis are disordinal interaction effects. Figure 5.7 displays a disordinal two-way interaction. The multiplicative composition rule suggests that auditors should follow an ordinal interaction as displayed in Figure 5.8. The standard ANOVA analysis is not very effective at picking up this type of ordinal interaction (See Buckless and Ravenscroft, 1988). Finding nonsignificant two-way and three-way interactions does not unambiguously indicate an additive composition rule.

Contrast coding is one method which could be used to test for a multiplicative composition rule (See Buckless and Ravenscroft, 1988). The standard ANOVA analysis assigns the following values to the experimental cells for testing the main effects (testing an additive composition rule):

<u>Cell</u>	<u>Main Effect Coding</u>		
	<u>EE Coding</u>	<u>ARR Coding</u>	<u>TDR Coding</u>
EE ₁ ARR ₁ TDR ₁	-1	-1	-1
EE ₁ ARR ₁ TDR ₂	-1	-1	1
EE ₁ ARR ₂ TDR ₁	-1	1	-1
EE ₁ ARR ₂ TDR ₂	-1	1	1
EE ₂ ARR ₁ TDR ₁	1	-1	-1
EE ₂ ARR ₁ TDR ₂	1	-1	1

EE_n, ARR_n, TDR_l	1	1	-1
EE_n, ARR_n, TDR_n	1	1	1

Contrast coding would assign the following values to the experimental cells for testing a multiplicative composition rule assuming equal weighting of the factors:

<u>Cell</u>	<u>Multiplicative Coding</u>
EE_l, ARR_l, TDR_l	-2.375
EE_l, ARR_l, TDR_n	-1.375
EE_l, ARR_n, TDR_l	-1.375
EE_l, ARR_n, TDR_n	0.625
EE_n, ARR_l, TDR_l	-1.375
EE_n, ARR_l, TDR_n	0.625
EE_n, ARR_n, TDR_l	0.625
EE_n, ARR_n, TDR_n	4.625

The coding used in the experimental cells for the multiplicative composition rule is not orthogonal to the coding used for an additive composition rule. The correlation between the additive coding and multiplicative coding is equal to .55. This nonorthogonality creates problems, in that, the use of contrast coding will not unambiguously indicate a multiplicative versus additive composition rule. Contrast coding will obtain statistically significant results more than five percent of the time when auditors are following an additive composition rule.

The additive versus multiplicative composition rule was tested by performing an incremental F test using the additive and multiplicative coefficients (see Pindyck and Rubinfeld, 1981). Under this approach

two regression equations were constructed. One regression equation was restricted to include only the regression coefficients for the additive composition rule. The restricted regression equation can be stated as follows:

$$AR = \alpha + \beta_{EE}X_{EE} + \beta_{ARR}X_{ARR} + \beta_{TDR}X_{TDR} + \epsilon$$

Where: AR - audit risk assessment.

α - overall mean of the population.

β_{EE} - effect of expectations of errors.

β_{ARR} - effect of analytical review risk.

β_{TDR} - effect of tests of details risk.

ϵ - experimental error.

X_i - value assigned to each observation (i.e. either -1 or 1 in this case).

The second regression equation was constructed to include both the regression coefficients for the additive composition rule and the regression coefficients for the multiplicative composition rule (contrast coding coefficients). This unrestricted regression equation can be stated as follows:

$$AR = \alpha + \beta_{EE}X_{EE} + \beta_{ARR}X_{ARR} + \beta_{TDR}X_{TDR} + \beta_{MUL}X_{MUL} + \epsilon$$

Where: β_{MUL} - interactive effect of the multiplicative composition rule.

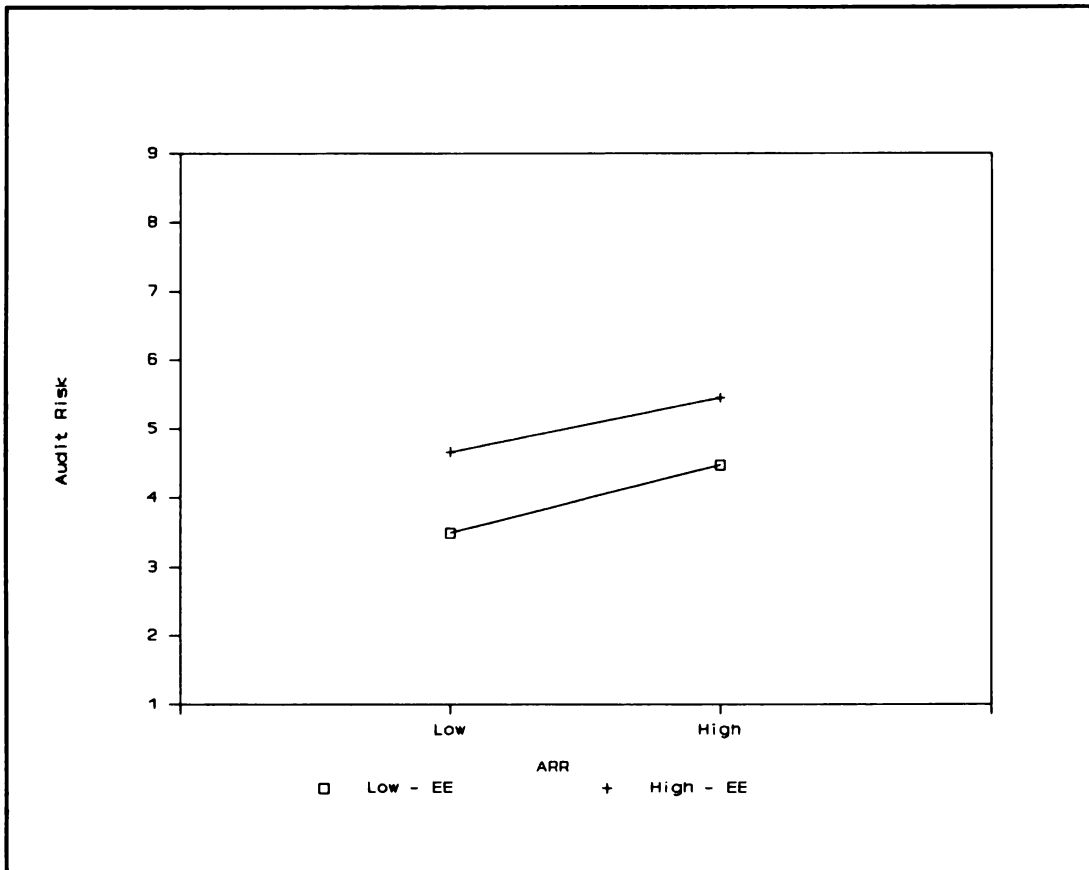
The numerator for the incremental F statistic is equal to the increase in the sum of squared residuals divided by the number of parameter restrictions (one in this case). The denominator is equal to the error sum of squares in the unrestricted regression equation divided by the number of degrees of freedom in the unrestricted regression equation (Pindyck and Rubinfeld, 1981). The incremental F

test is superior to performing t-tests on individual regression coefficients when there is a high degree of multicollinearity. The incremental F test is not affected by multicollinearity whereas individual t-tests are affected by multicollinearity.

Table 5.21 presents R^2 for the restricted and unrestricted regression equations and the incremental F tests. The values assigned to the experimental cells for the multiplicative composition rule were determined assuming unequal weights for the risk components. The weights were determined by taking the ratio of the high level marginal mean to the low level marginal mean for each factor. These weights were then used to construct the values assigned to the experimental cells for the multiplicative composition rule. The F values obtained were insignificant for both the account level and audit objective level groups. The results indicate that auditors follow an additive composition rule for combining components of the audit risk model. The additive result occurred for both the group of auditors who completed the risk assessments at the account level and the group of auditors who completed the risk assessments at the audit objective level.

Table 5.21
Summary Results for Incremental F Tests

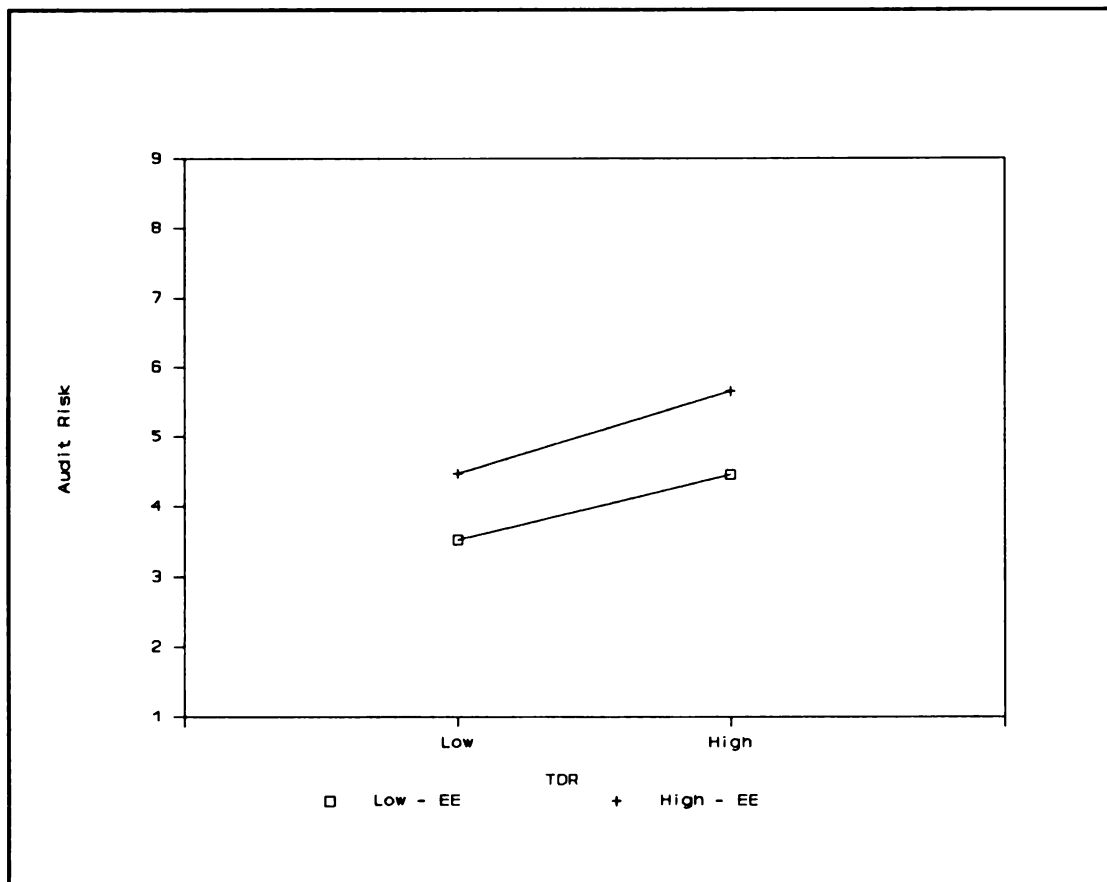
	Account Level	Objective Level
R^2 of Regression Model With Additive Coefficients	.161	.280
R^2 of Regression Model With Additive and Multiplicative Coefficients	.161	.281
F Value	.001	.234
.....		



Panel A
Cell Means (N = 30)

		EE	
		Low	High
ARR	Low	3.50	4.67
	High	4.48	5.45

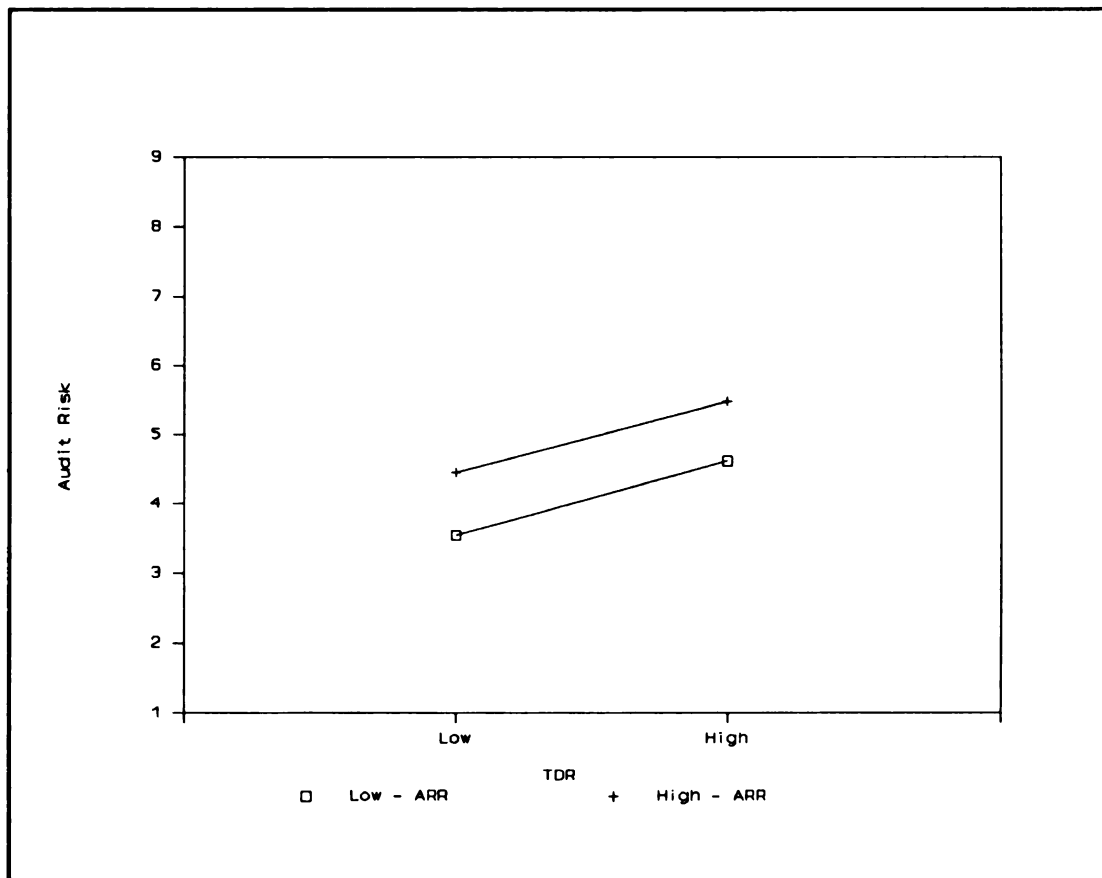
Figure 5.9
Graph of Account Level EE by ARR Interaction



Panel A
Cell Means (N = 30)

		EE	
		Low	High
TDR	Low	3.53	4.47
	High	4.45	5.65

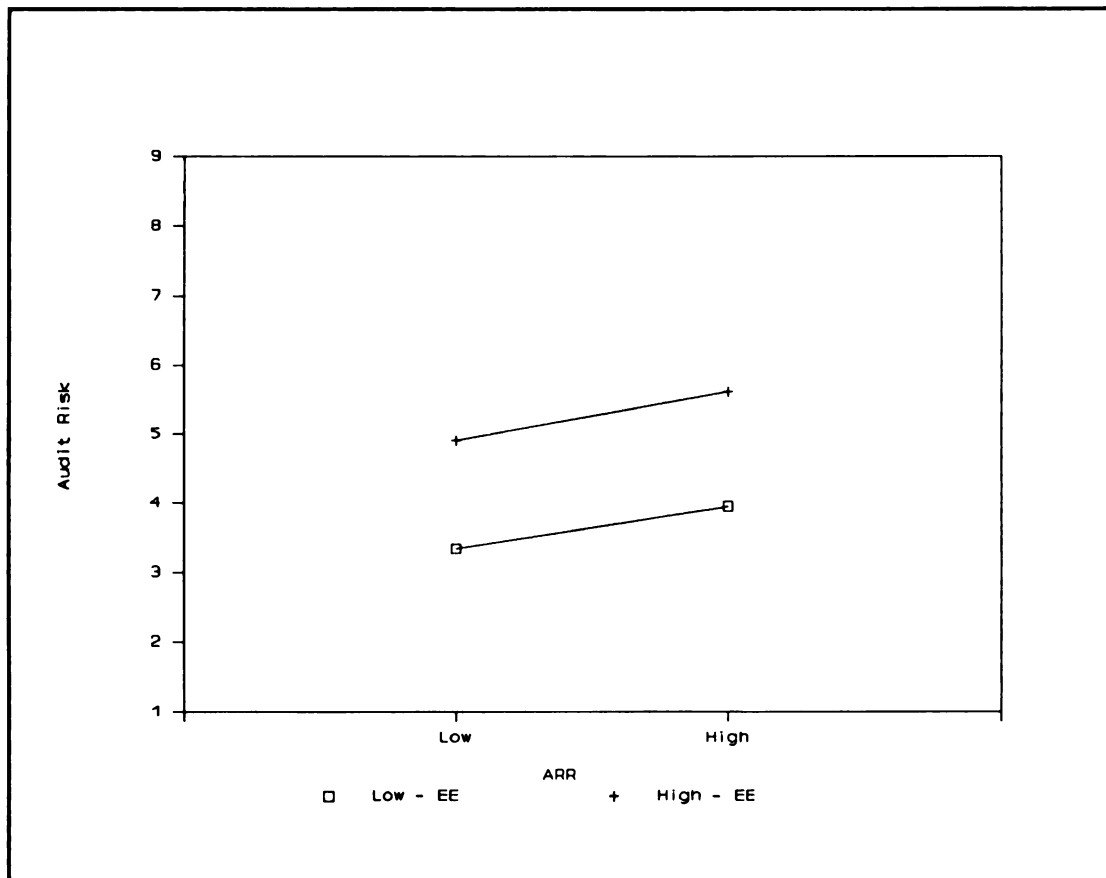
Figure 5.10
Graph of Account Level EE by TDR Interaction



Panel A
Cell Means (N = 30)

		ARR	
		Low	High
TDR	Low	3.55	4.45
	High	4.62	5.48

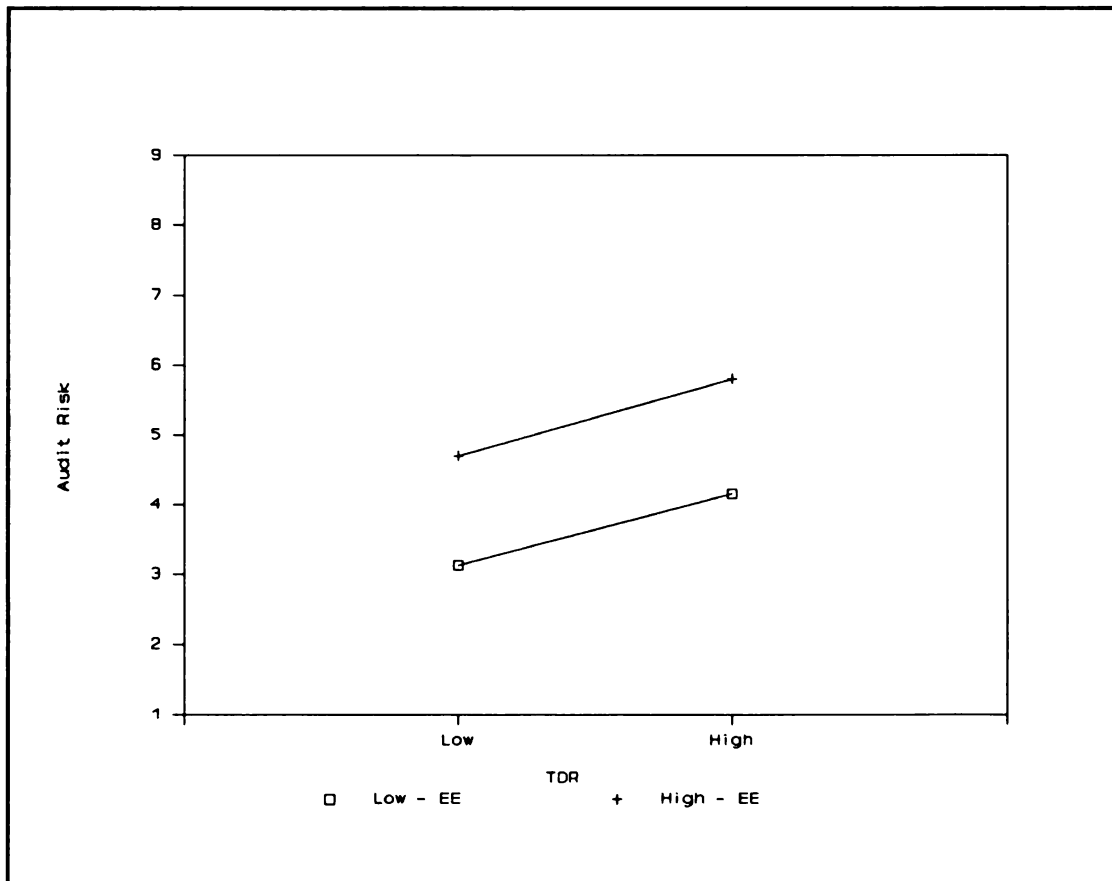
Figure 5.11
Graph of Account Level ARR by TDR Interaction



Panel A
Cell Means (N = 31)

		EE	
		Low	High
ARR	Low	3.34	4.90
	High	3.95	5.61

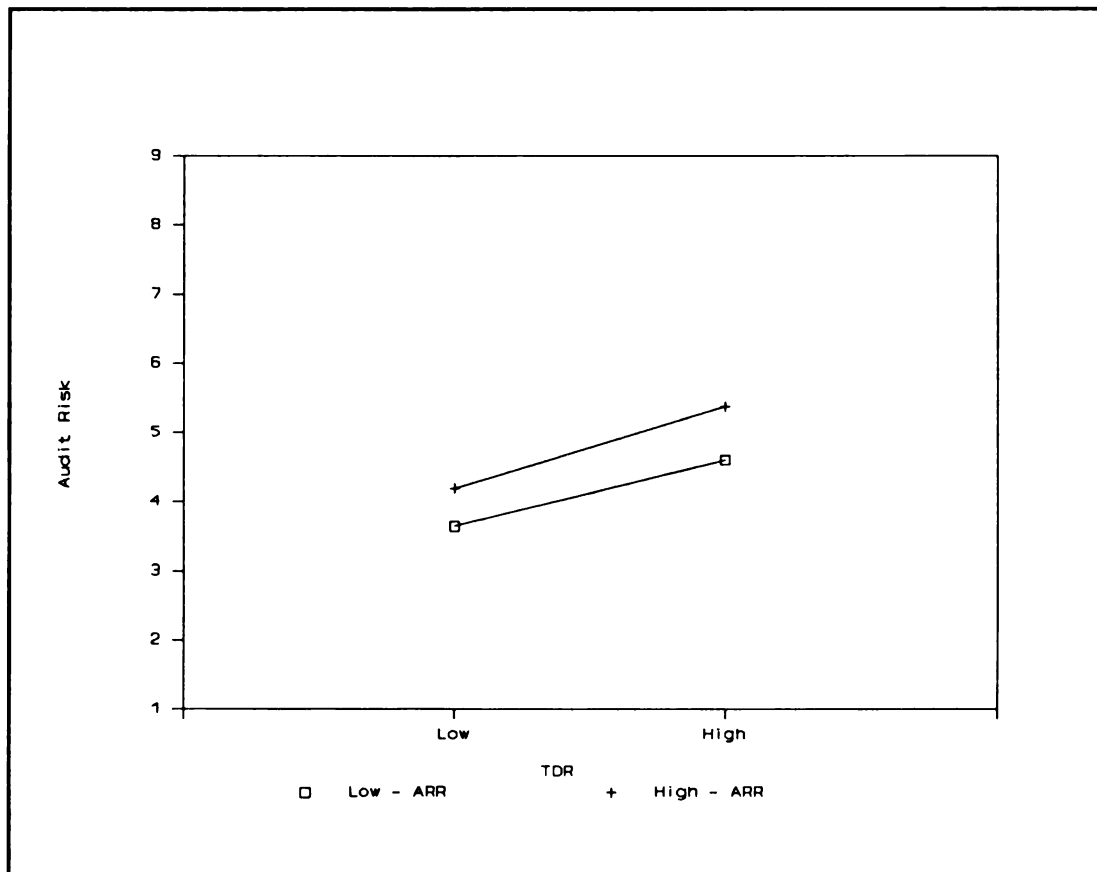
Figure 5.12
Graph of Objective Level EE by ARR Interaction



Panel A
Cell Means (N = 31)

		EE	
		Low	High
TDR	Low	3.13	4.71
	High	4.16	5.81

Figure 5.13
Graph of Objective Level EE by TDR Interaction



Panel A
Cell Means (N = 31)

		ARR	
		Low	High
TDR	Low	3.65	4.19
	High	4.60	5.37

Figure 5.14
Graph of Objective Level ARR by TDR Interaction

To further confirm that the auditors are following an additive composition rule a visual inspection of the two-way interactions was performed. Figures 5.9 through 5.14 present the two-way interactions for expectations of errors, analytical review risk and tests of details risk. A multiplicative composition rule is signified when the two-way interactions look like the interaction presented in Figure 5.8. An additive composition rule is signified when the two lines in the graph are parallel. The graphs of the two-way interactions suggest that the auditors are following an additive composition rule.

Previous auditing studies have found firm affiliation to be a significant explanatory variable of participant responses. ANOVA techniques were used to ascertain the appropriateness of performing the above analysis on the aggregate across audit firm responses. In this analysis the auditors' subjective assessments of audit risk were used as the dependent variable. The independent variables were expectations of errors, analytical review risk, tests of details risk and firm affiliation. The firm main effect was not significant for either the account level or audit objective level group. The only significant interaction effect in this analysis was the tests of details risk by firm interaction for the audit objective level group. The omega squared for this interaction was .018. Omega squared varies between zero and one with zero signifying no treatment effect. The significant tests of details by firm interaction suggests that the level of importance auditors placed on the tests of details manipulation differed across firms. This interaction does not suggest that auditors are following a different composition rule across firms. Furthermore,

the omega squared indicates that the relative treatment magnitude of this effect is very small and not very important. The above results support performing the model diagnostic procedures on the overall group responses. No further analysis was performed on the individual firm responses.

Another variable which could influence participant responses is the practice experience of the participants. For example, the cues presented in this study could be less salient to a participant who is not familiar with manufacturing clients than a participant who is familiar with manufacturing clients. ANOCOVA was used to determine the effect, if any, of the participants' practice experience. In this analysis the participants percentage of manufacturing clients was used as a covariate. The dependent variable for this analysis was the auditors' subjective assessment of audit risk. The independent variables were the manipulations to expectations of errors, analytical review risk and tests of details risk. No significant main or interactive practice effects were found for the participants' practice experience. These results support the results obtained by the initial analysis. No further analysis was conducted on auditor practice effects. This concludes the discussion of the analysis pertaining to H_1 . The next section summarizes the implications of the above analysis.

The purpose of the above analysis was to model auditors risk assessments. The results indicate that an additive (linear) composition rule is representative of auditor risk assessments. This result occurred for risk assessments made with respect to a specific account and for risk assessments made with respect to a specific audit

objective within the account. These findings are consistent with prior auditing and psychology literature which have found additive models to be representative of participant behavior. These findings are not consistent with the authoritative auditing literature which indicate that the components of audit risk should be combined in a multiplicative fashion. SAS No. 39 [1981] indicates that control risk, analytical review risk and tests of details risk should be combined multiplicatively. While SAS No. 47 [1983] indicates that inherent risk, control risk and detection risk should be combined multiplicatively.

The findings of the current study support the conclusion of the researcher that auditors are unable to combine risk assessments in a multiplicative fashion as set forth by the authoritative literature. These results are consistent with Tversky and Kahneman's adjustment and anchoring heuristic (Kahneman, Slovic and Tversky, 1982). Tversky and Kahneman argue that a natural starting point for the estimation of a compound probability is with the probabilities of the elementary events (expectations of errors, analytical review risk and tests of details risk). An adjustment is then made to the initial starting point to yield the final estimate. The adjustment from the initial starting point typically is in the correct direction but insufficient. An additive model is indicative of such a heuristic.

The overall probability of a conjunctive event is lower than the probability of each elementary event. As a result the estimate of the overall conjunctive probability is overestimated when the anchoring and adjustment heuristic is used. In the context of the audit risk model

the use of the anchoring and adjustment heuristic would result in an overestimate of audit risk. The participants intuitive assessments of audit risk were compared to the value of audit risk produced by the algorithmic combination of expectations of errors, analytical review risk and tests of details risk¹⁵. The intuitive assessments of audit risk should be higher than the algorithmic combination values if participants are following the anchoring and adjustment heuristic. The mean intuitive assessments of audit risk for the account level and audit objective level groups were .50 and .51 respectively. The mean algorithmic values were .17 and .18 respectively. The differences in the values were in the hypothesized direction. This finding suggests that auditors are designing audits which are achieving a lower level of audit risk than suggested by the audit risk model. This implies that auditors are performing more audit work than necessary for a given situation.

The findings of the current study indicate that auditors follow an additive composition rule for risk assessments made at both an account and audit objective level. SAS No. 39 [1981] and SAS No. 47 [1983] indicate that risk assessments should be made at a disaggregated level. However, it is unclear what the appropriate level of disaggregation should be. SAS No. 55 [1988] clarified this issue by indicating that risk assessments should be made at an audit objective level. The results suggest that auditors are unable to combine risk components in a multiplicative fashion at the aggregation level

¹⁵ The scaler values for expectations of errors, analytical review risk, tests of details risk and audit risk were converted to percentages by dividing by nine.

specified by the authoritative literature. Revisions may be required to better refine and clarify the appropriate aggregations level. A study conducted by Libby et al. [1985] supports the argument that there are problems with the aggregation level specified by the current authoritative literature. In Libby et. al.'s [1985] study auditors were required to make audit assessments at a processing stream level. The conclusions reached by Libby et al. [1985] was that auditors combine inherent risk and control risk factors multiplicatively. Other studies examining the assessment of audit risk have required auditors to make audit evaluations with respect to a particular account. The results obtained by these studies are consistent with the findings of the current study. Requiring auditors to evaluate risk components at an account level may increase the cognitive strain thereby forcing auditors to use simplifying rules. Requiring auditors to process risk components at a lower level of aggregation could reduce cognitive strain allowing auditors to follow a multiplicative rule. Before more definitive conclusions can be reached additional research is required. The findings of this study suggest that further behavioral research is needed to determine the effect of decomposition on auditors decisions. Additionally, further normative theory development is needed to determine under what conditions it is appropriate to use an additive versus multiplicative rule. This concludes the discussion on the implications of the above analysis.

5.2.2 Determination of Scale Values

The second research question was concerned with determining the relative weights assigned to the expectations of errors factor, analytical review risk factor and tests of details risk factor. The null hypothesis for H_2 was that auditors would assign equal weights to the three risk factors. Table 5.22 presents the omega squared statistic calculated from the overall analysis of variance model.

Table 5.22
Omega Squared Summary Table

Source	Account Level	Objective Level
Expectations of Errors (EE)	.068	.172
Analytical Review Risk (ARR)	.040	.028
Tests of Details Risk (TDR)	.057	.074
EE x ARR	.000	.000
EE x TDR	.000	.000
ARR x TDR	.000	.000
EE x ARR x TDR	.000	.000

Omega squared measures the proportion of variance in the dependent variable accounted for by the independent variables. T-tests were performed to test for differences between the beta coefficients of the three risk components. Table 5.23 presents the beta coefficients for expectations of errors, analytical review risk and tests of details risk using -1/1 coding for the experimental cells. Table 5.24 presents the t-tests for differences between the beta coefficients. The null

Table 5.23
Beta Coefficients and Standard Errors

	<u>Account Level</u>		<u>Objective Level</u>	
	Beta	Standard Error	Beta	Standard Error
Expectations of Error	.533	.129	.806	.105
Analytical Review Risk	.442	.129	.331	.105
Tests of Details Risk	.525	.129	.532	.105

Table 5.24
Difference Beta Coefficients

	<u>Account Level</u>		<u>Objective Level</u>	
	Beta	T Value	Beta	T Value
$\beta_{EE} - \beta_{ARR}$	.091	.502	.475	3.210*
$\beta_{EE} - \beta_{TDR}$	.008	.046	.274	1.850
$\beta_{ARR} - \beta_{TDR}$	-.083	.456	-.201	1.360

* $p < .01$.

hypothesis for H_2 cannot be rejected for the account level group but can be rejected for the audit objective level group. The beta coefficient for expectations of errors was significantly different than the beta coefficient for analytical review risk for the audit objective level group. The results indicate that auditors do not assign equal weights to the risk factors. This concludes the discussion of the analysis pertaining to H_2 . A discussion of the implications of the current findings are discussed next.

The purpose of the above analysis was to determine the scale values assigned to each risk component factor by participant auditors. The findings suggest that auditors do differentially weight risk component factors. The group of participants evaluating the audit objective level instrument assigned a higher weight to the expectations of errors risk factor compared to the analytical review risk factor. The risk factors manipulated for expectations of errors could be classified as inherent risk factors. Evidently auditors do consider inherent risk factors when evaluating audit risk. SAS No. 39 [1981] implicitly set inherent risk equal to one as it was felt that assessment of such a risk would be difficult and potentially costly to quantify. SAS No. 47 [1983] subsequently incorporated inherent risk explicitly into the audit risk model. The current results suggest that inherent risk should and is explicitly considered by auditors. Auditors believe the benefits to outweigh the costs for considering inherent risk factors. This concludes the discussion of the implications.

5.2.3 Effect of Judgment Task

Research question three was concerned with the effect of the judgment task on auditors' risk assessments. Participants evaluated the audit cases with respect to either an account balance or a specific audit objective within the account. ANOVA techniques were used to test the equality of the dependent measure means across the two treatment groups. The research hypothesis for H_3 stated that the judgment task would affect auditors' risk assessments. In statistical terms, the account level and audit objective level group means should be different. The dependent variable for this analysis was the auditors' subjective audit risk assessments. The independent variables were expectations of errors, analytical review risk, tests of details risk and judgment task. Table 5.25 presents the results from the ANOVA analysis. Contrary to expectations, the ANOVA tests indicated that the treatment group means were equal for the account level and audit objective level groups. No significant differences were found for the judgment task main effect and interaction terms.

One explanation for the nonsignificant results could be the influence of extraneous third variables. Prior auditing studies have found that variables such as firm affiliation, audit experience, client practice and audit approach affect auditor judgments (See literature review). One way to control for these results is to use analysis of covariance techniques (ANOCOVA). ANOCOVA permits the post hoc experimental control of one or more extraneous third variables by removing their influence on the main treatment variable. ANOCOVA improves the precision of an experiment by removing possible sources of

Table 5.25
Aggregation Level - ANOVA Summary Table

Source	Sum of Squares	DF	Mean Square	F	Pr > F
<u>Between Subjects Effects</u>					
Aggregation Level (AGG)	.66	1	.66	.03	.8559
<u>Within Subjects Effects</u>					
Expectations of Errors (EE)	218.93	1	218.93	84.18	.0001
Analytical Review Risk (ARR)	72.75	1	72.75	54.63	.0001
Tests of Details Risk (TDR)	136.33	1	136.33	87.34	.0001
EE x AGG	9.10	1	9.10	3.50	.0664
ARR x AGG	1.50	1	1.50	1.13	.2923
TDR x AGG	.01	1	.01	.00	.9491
EE x ARR	.08	1	.08	.15	.7013
EE x TDR	.84	1	.84	.95	.3334
ARR x TDR	.28	1	.28	1.06	.3070
EE x ARR x AGG	.67	1	.67	1.23	.2723
EE x TDR x AGG	.31	1	.31	.35	.5539
ARR x TDR x AGG	.51	1	.51	1.92	.1706
EE x ARR x TDR	.01	1	.01	.03	.8724
EE x ARR x TDR x AGG	.01	1	.01	.03	.8724

variance in the dependent variable that were not controlled by the experimental design. Removing the influences of these third variables reduces the residual error thereby increasing the pure effect of the treatment variable.

Table 5.26 presents the results from the ANOCOVA analysis using firm affiliation, years of auditing experience, percentage of manufacturing clients and audit approach as the covariates. A significant difference was found for the expectations of errors by judgment task interaction. No other significant differences were found for the judgment task effects. The significant expectations of errors by judgment task interaction suggests that a different level of importance is placed on expectations of errors by the two treatment groups.

In general the results do not support the research hypothesis that the judgment task affects auditor risk assessments. Only one judgment task factor out of eight such factors was significant. The probability of this occurring by chance alone is approximately 34%. The general nonsignificance of the judgment task effects could have occurred because of the overall importance placed on the valuation objective. The valuation objective is one of several audit objectives which comprises the overall risk assessment for an account. Sullivan [1988] notes that the valuation objective often represents high risks to the auditor. Given that the valuation objective is the most important audit objective with respect to accounts receivable, it would be reasonable to expect judgments made with respect to accounts receivable to be similar to judgments made with respect to the valuation of accounts receivable. Thus, the overall importance of the

Table 5.26
Aggregation Level - ANOCOVA Summary Table[#]

Source	Sum of Squares	DF	Mean Square	F	Pr > F
<u>Between Subjects Effects</u>					
Aggregation Level (AGG)	3.44	1	3.44	.16	.6919
<u>Within Subjects Effects</u>					
Expectations of Errors (EE)	9.23	1	9.23	3.25	.0773
Analytical Review Risk (ARR)	7.81	1	7.81	6.17	.0163
Tests of Details Risk (TDR)	23.63	1	23.63	16.26	.0002
EE x AGG	11.67	1	11.67	4.11	.0479
ARR x AGG	1.28	1	1.28	1.01	.3201
TDR x AGG	.06	1	.06	.04	.8446
EE x ARR	1.96	1	1.96	3.49	.0675
EE x TDR	.19	1	.19	.21	.6493
ARR x TDR	.04	1	.04	.15	.7038
EE x ARR x AGG	.47	1	.47	.84	.3643
EE x TDR x AGG	.03	1	.03	.03	.8593
ARR x TDR x AGG	.87	1	.87	3.27	.0764
EE x ARR x TDR	.00	1	.00	.01	.9412
EE x ARR x TDR x AGG	.03	1	.03	.10	.7541

The covariates were firm affiliation, years of auditing experience, percentage of manufacturing clients and audit approach.

valuation objective could have caused the subjective assessment of audit risk to be similar across the two treatment groups. This concludes the discussion of the analysis pertaining to H_3 . A discussion of the implications of the analysis follows.

The purpose of the above analysis was to determine the effect of the judgment task on auditor judgments. The hypothesized effect of the judgment task on auditor judgments was not supported by the current study. The findings of the current study are not conclusive with respect to the effect of the judgment task on auditor judgments. The current study only manipulated valuation risk cues¹⁶ for both treatment groups. A different result could have been obtained if a different audit objective was manipulated. Additionally, the use of more divergent judgment tasks could have obtained different results. The current study required auditors to make risk assessments either with respect to a specific account or specific audit objective. If auditors were required to make risk assessments with respect to either a specific audit objective or specific cycle, different results could have been obtained. This concludes the discussion of implications.

5.2.4 Consensus of Auditors

The final research question addressed by the second experiment was concerned with the effect of the judgment task on auditor consensus. Two statistics were used to test this research question,

¹⁶ The selection of the valuation risk cues was based on the first experiment. Valuation risk cues were selected as auditors indicated that these cues were the most important in their risk assessments and thus, would have the highest probability of being attended to in the second experiment.

the mean correlation coefficient and the variance around the mean audit risk assessments for each experimental cell. The research hypothesis for H_4 stated that there would be higher consensus for audit risk assessments made by the audit objective level group as compared to the account level group.

Tables 5.27 and 5.28 present the mean correlation coefficients both within each firm and across all firms for the audit risk assessments. The Pearson correlation coefficients ranged from a low of $-.859$ to a high of $.976$ for the account level group. Thirty of the 435 Pearson correlation coefficients were negative for the account level group. The Pearson correlation coefficients ranged from a low of $-.207$ to a high of 1 for the audit objective level group. Five of the 465 Pearson correlation coefficients were negative for the audit objective level group.

The mean correlations from previous auditing studies ranged from a low of $.15$ reported by Reckers & Taylor [1979] to a high of $.70$ reported by Ashton [1974]. The mean correlations for the audit objective level group are consistent with those reported by Ashton [1974]. In all cases the mean correlation coefficients were higher for the audit risk assessments made by the audit objective level group. Assuming no difference in consensus across the two judgment tasks, the probability of the audit objective level group obtaining a higher consensus measure for all five firms is equal to $1/32 \approx .03^{17}$.

¹⁷ An alternative way to view this test is to ask yourself what is the probability of obtaining five tails in a row from the toss of a fair coin. There are only two possible outcomes from the toss of a fair coin (heads or tails), therefore there are 2^5 (32) possible outcomes in the sample space.

Table 5.27
Mean Pearson Correlations

	Mean Correlation Coefficient Account Level	Mean Correlation Coefficient Objective Level
Firm 1	.343	.657
Firm 2	.480	.633
Firm 3	.427	.658
Firm 4	.693	.874
Firm 5	.613	.755
All Firms	.486	.632*

* Significantly different at .001 level.

Table 5.28
Mean Spearman Correlations

	Mean Correlation Coefficient Account Level	Mean Correlation Coefficient Objective Level
Firm 1	.343	.659
Firm 2	.495	.631
Firm 3	.421	.675
Firm 4	.681	.809
Firm 5	.598	.755
All Firms	.492	.635*

* Significantly different at .001 level.

Based on this result, the null hypothesis of no difference in the consensus measure can be rejected.

The mean correlation coefficients across all firms were also tested using both the Kruskal Wallis nonparametric ANOVA and ANOVA. The mean correlation coefficients were found to be significantly different for both procedures. The results provide support for the research hypothesis that the mean correlations (consensus) is higher for risk assessments made by the audit objective level group as compared to the account level group.

Previous auditing studies have found firm affiliation to be a significant explanatory variable for participant responses. This being the case, it would be reasonable to expect that the mean correlation coefficients within a firm would be higher than the mean correlation coefficients outside the firm. Table 5.29 presents the mean within firm and across firm Pearson correlation coefficients. Contrary to expectations, five of the eleven across firm mean correlations were higher than the within firm mean correlations. These results suggest that there is not a strong firm effect.

The analysis to this point has been concerned with the raw mean correlation coefficients. The Social Judgment Theory form of the Lens model suggests breaking the raw mean correlation coefficient into three components: cue weighting (G), each individual's consistency (R) and configurality (C). Table 5.30 reports the mean correlation coefficients for each of these components.

Table 5.29
Mean Within Firm and Across Firms Pearson Correlations

	<u>Account Level</u>		<u>Objective Level</u>	
	<u>Within Firm</u>	<u>Across Firm</u>	<u>Within Firm</u>	<u>Across Firm</u>
Firm 1	.343	.441	.657	.578
Firm 2	.480	.509	.633	.638
Firm 3	.427	.455	.658	.622
Firm 4	.693	.578	.874	.617
Firm 5	.613	.569	.755	.694
Firm 6	-	-	.653	.687
All Firms	.433	.499	.655	.626

Table 5.30
Mean Pearson Correlation Coefficient Lens Model Statistics

	<u>Account Level</u>	<u>Objective Level</u>
Mean r_a	.486	.632*
Mean G	.597	.749*
Mean R_i	.877	.915
Mean C	-.024	-.010

 * Significantly different at .001 level.

The table indicates that the difference in consensus across the two judgment tasks is primarily due to cue weighting (G). The mean correlation coefficient for G was statistically different using both the Kruskal Wallis nonparametric ANOVA and ANOVA. The results suggest that auditors making risk assessments at the audit objective level had much higher agreement in cue weighting. Another item of note in Table 5.30 is the mean correlation coefficient for C. C is a measure of the fit of the model used to represent participant behavior. A low value indicates good fit in the model. The results suggest that the additive model is a good representation of participant behavior. The analysis so far has used mean correlations as a measure of consensus. The analysis that follows uses the experimental cell variances as a measure of consensus.

Table 5.18 gives the standard deviations of the risk assessments around their mean ratings for each experimental cell. The only variance that was significantly different at the .05 level was the low expectations of errors, high analytical review risk and high tests of details risk experimental cell. The variance was lower for the audit objective level group in all experimental cells. The probability of this occurring by chance alone is equal to $1/256 \approx .004$. Thus, the null hypothesis of equal variance across the two treatment groups can be rejected. The above results provide support for the research hypothesis that the variance is lower for risk assessments made at the audit objective level as compared to the account level. This concludes the discussion of the analysis pertaining to H_4 . The implications of the analysis follow in the next discussion.

The objective of the above analysis was to determine the effect of the judgment task on auditor consensus. The findings provide support for the hypothesis that there is higher consensus for the audit objective level assessment. Both the mean correlation and variance statistics indicated higher consensus for the audit objective level group. The consensus results suggest that as the cognitive strain decreases agreement across auditors increases.

The results of the current study have implications for both prior and future research efforts. The results signify the care that must be exercised when interpreting and designing research efforts. The current study shows that the judgments of auditors are affected by the judgment task. If consensus is a good surrogate for accuracy¹⁸ researchers must be very careful in their interpretation of previous auditing studies which abstracted significantly from the real world judgment task. Moreover, future researchers concerned with obtaining an understanding of audit practice must be careful to construct a task which is representative of the actual real world judgment task. Otherwise, the results will be less meaningful. This completes the discussion of implications.

5.2.5 Analysis of Debriefing Information

The purpose of this section was twofold: first, to establish that the response bias in the second experiment was not a problem and second, to establish the equality of participants assigned to the two

¹⁸ Libby [1981] notes that consensus judgments provide the backbone for much of accounting practice.

treatment groups. Auditors who participated in the first experiment were asked to complete the second experiment. Participants were asked to complete the same instrument type they completed in the first experiment. Ten of the participants completing the first experiment instrument did not complete the second experiment instrument. The test of equality of groups was repeated on the second experiment data as the group composition of the second experiment was not identical to the group composition of the first experiment. This analysis provides the background for the detailed analysis of participant responses in the preceding subsections.

Sixty one of seventy one auditors who participated in the first experiment also participated in the second experiment. The participants who did not respond to the second experiment instrument could be systematically different than the participants who did respond to the second experiment instrument. The responses from the second experiment would be biased if a systematic difference existed. The first experiment data was used to determine if there was such a response bias in the results. The seventy one auditors who participated in the first experiment were partitioned into two groups. One group consisted of those participants who completed the second experiment instrument. The other group consisted of those participants who did not complete the second experiment instrument. MANOVA techniques were used to test for differences between the two groups. The dependent variables for this analysis was the risk component cues. The independent variable for this analysis was response/nonresponse on the second experiment instrument. MANOVA found no significant

differences across the response and nonresponse groups. The results suggest that there is not a response bias in the second experiment results.

The next step was to establish the equality of the participants assigned to the account level and audit objective level groups. A formal random design was not used to assign participants to the two treatment groups. This does not imply that two non-random samples were obtained by the current study. Non-random designs increase the possibility of having systematic differences between treatment groups. MANOVA and univariate t-tests were used to test for differences between the two treatment groups. The dependent variables for this analysis were the demographic variables collected. Table 5.31 presents this demographic information across the account level and audit objective level groups. The questions used to collect this information are shown in Appendix B. The independent variable for this analysis was the partitioning of the participants into the two treatment groups. Neither the MANOVA nor the univariate t-tests found significant differences in the demographic variables across the two treatment groups. The results suggest that the treatment groups do not differ with respect to the demographic variables.

5.3 Summary

A discussion of the analyses and results for each research question, along with a report of secondary issues and debriefing data were presented in this chapter. The research questions were addressed by two interrelated experiments. The primary purpose of the first

Table 5.31
Experiment II Demographic Information Across Instruments (N = 61)

	Account Level	Objective Level
Mean age of participants	32.2	31.4
Mean number of years of business experience	10.3	9.3
Mean number of years of auditing experience	8.6	8.6
Mean number of years of public accounting experience	8.8	8.6
Mean number of years of Big Eight accounting experience	8.4	7.8
Percentage of participants with CPA certificate	96.7%	100.0%
Percentage of participants with undergraduate accounting degree	90.0%	71.0%
Percentage of participants with graduate degree	26.7%	19.4%
Percentage of participants who were partners	20.0%	25.8%
Percentage of participants who were managers	70.0%	64.5%
Percentage of participants who were supervisors	10.0%	6.5%
Percentage of participants who were seniors	0.0%	3.2%
Mean number of years at present job title	2.4	2.0
Mean percentage of audit time spent on manufacturing clients	42.4%	45.0%
Mean percentage of audit time spent on clients where a control reliance approach is used	58.0%	38.9%

Table 5.31 (cont'd.)

	Account Level	Objective Level
Mean willingness to accept risk (1 = Much less willing, 5 = Much more willing)	2.9	2.9
Mean interest in task (1 = Of no interest, 4 = Very interesting)	2.9	2.9
Mean representativeness of task (1 = Very representative, 4 = Very unrepresentative)	2.9	2.9
Mean number of minutes to complete task	84.0	79.8

experiment was to select risk cues to manipulate for the second experiment. The purpose of the second experiment was to model auditors' subjective assessments of audit risk and to examine the effect of the judgment task on auditor risk assessments. The major findings pertaining to the five research questions are summarized as follows:

Composition rule - The results of the second experiment indicate that auditors combine expectations of errors, analytical review risk and tests of details risk in an additive fashion. The additive model was obtained for both the assessments made with respect to a specific account and the assessments made with respect to a specific audit objective within the account.

Scale values - The results of the second experiment indicated that the weights assigned to the expectations of errors factor and the analytical review risk factor were statistically different for the audit objective level group. No statistical differences were found for the account level group.

Effect of judgment task - The results of the first experiment indicate that the judgment task affected auditors' judgments. The weights assigned to the risk cues differed depending on the judgment task. The results of the second experiment did not indicate a difference across the two judgment tasks.

Consensus - The results of the first and second experiment indicate that the judgment task affected consensus. Higher agreement was found across auditors for assessments made at the audit objective level as compared to the account level.

A summary of the current study is presented in the final chapter. Included in this chapter is a discussion of the implications, contributions and limitations of the current study. This chapter also includes a discussion of the suggestions for future research stemming from the current study.

CHAPTER VI

SUMMARY, IMPLICATIONS, CONTRIBUTIONS AND LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

6. Overview

In this chapter a summary of the research results is presented along with a discussion of the implications, contributions and limitations of the current study. This chapter also contains future research suggestions. A research results summary along with a discussion of the implications is presented first. The current study's contributions and limitations follows in the second section. The third section contains future research suggestions. A final summary is presented in the last section.

6.1 Summary of results and implications

This study's objective was to examine auditor judgments related to audit risk. The research questions investigated by this study were as follows:

- 1) How do auditors combine information on the components of the audit risk model in forming audit risk assessments?
- 2) What are the weights auditors assign to each of the components of the audit risk model?
- 3) What effect does the judgment task have on the auditors' risk assessments?
- 4) What effect does the judgment task have on the degree of consensus among auditors?

This research effort also addressed the following secondary question:

- 5) What risk cues do auditors consider most important when evaluating expectations of errors, analytical review risk and tests of details risk?

Two interrelated experiments were conducted to address these research questions. In the first experiment auditors were asked to evaluate the relative importance of various risk cues related to expectations of errors, analytical review risk and tests of details risk. The auditors were asked to evaluate these risk cues with respect to a specific firm and aggregation level. Approximately half of the participants were asked to evaluate the risk cues with respect to an account balance while the other half of the participants were asked to evaluate the risk cues with respect to a specific audit objective within the account. The risk cues were selected based on current authoritative literature, prior auditing research, an auditing text and the researcher's audit experience. Seventy one auditors affiliated with six "Big-Eight" accounting firms participated in this phase of the study. The results of the first experiment were used to select the manipulations to expectations of errors, analytical review risk and tests of details risk in the second experiment. The research questions addressed and the results obtained are discussed subsequently.

In the second experiment auditors were asked to assess the perceived level of audit risk for several audit situations. The case profiles presented varied risk component levels as well as aggregation levels. The risk components examined were: expectations of errors, analytical review risk and tests of details risk. The manipulations to these risk components were selected based on the first experiment. One group of auditors was asked to evaluate the audit cases with respect to a specific account. The other group of auditors was asked to evaluate the audit cases with respect to a specific audit objective within the

account. Sixty one of the seventy one auditors participated in the first and second experiment.

The first two research questions were addressed by the second experiment. The null hypothesis for H₁ stated that auditors follow an additive composition rule for expectations of errors, analytical review risk and tests of details risk. The null hypothesis could not be rejected for either the account level group or audit objective level group.

SAS No. 39 [1981] and SAS No. 47 [1983] indicate that the components of the audit risk model logically combine in an multiplicative fashion. These pronouncements further indicate that risk assessments should be made at a disaggregated level. The exact level of disaggregation is not specified. SAS No. 55 [1988] clarified the disaggregation issue by indicating that risk assessments should be made with respect to specific audit objectives. The findings of the current study are not consistent with the authoritative literature. The findings are consistent with prior auditing and psychology studies which have typically found additive models to fit judgment processes. An additive model was found for both the account and audit objective level evaluations.

This study suggests auditors may be achieving lower levels of audit risk than desired. Changes in the methods of training auditors or in the techniques employed by auditors may be necessary to improve auditor risk assessments. Improvements may be achieved by evaluating audit risk at lower levels of aggregation. A study conducted by Libby et al. [1985] supports the argument that auditors can process risk

components in a multiplicative fashion at lower levels of aggregation. Libby et al.'s [1985] study required auditors to make risk assessments at a processing stream level. The conclusion reached by Libby et al. [1985] was that auditors combine inherent risk and control risk factors multiplicatively. Other studies examining audit risk have required auditors to make risk assessments at an account level (see literature review). The results obtained by these studies are consistent with the findings of the current study. Requiring auditors to make risk assessments at an account or audit objective level may increase the cognitive strain thereby forcing auditors to follow simplifying decision rules such as the adjustment and anchoring heuristic. Requiring auditors to process risk components at lower levels of aggregation may reduce cognitive strain thereby allowing auditors to process risk components using a more complex decision rule.

The findings of the current study suggest that further behavioral research is needed to determine the effect of decomposition on auditors decisions. Additionally, further behavioral research is needed to improve training and risk assessment techniques.

The null hypothesis for H_2 stated that auditors assign equal relative weights to expectations of errors, analytical review risk and tests of details risk. Limited support was obtained for H_2 . The null hypothesis could be rejected for the audit objective level group but could not be rejected for the account level group.

The findings of the current study suggest that auditors differentially weight risk component factors. Moreover, the results indicate that auditors not only consider inherent risk factors, but

that they are the most important factors when evaluating the valuation of accounts receivable. The expectations of errors manipulations represent manipulations to inherent risk factors. SAS No. 39 [1981] implicitly set inherent risk equal to one as it was felt that an assessment of such a risk would be difficult and potentially costly to quantify. SAS No. 47 [1983] subsequently incorporated inherent risk explicitly into the audit risk model. The current results indicate that inherent risk is explicitly considered by auditors. Evidently, auditors believe the benefits outweigh the costs for considering inherent risk factors.

Research questions three and four were addressed by both the first and second experiments. The null hypothesis for H_1 stated that the judgment task would have no affect on auditors' risk assessments. The null hypothesis was rejected in the first experiment and not the second experiment.

The results indicate that auditors' risk assessments are affected by the judgment task. The findings of the current study highlight the care that must be exercised when evaluating prior and future research efforts. If the objective of a research project is to obtain a better understanding of audit practice the researcher must be very careful to construct a task which is representative of the actual judgment task.

The null hypothesis for H_2 stated that there would be no difference in consensus across the two judgment tasks. The null hypothesis was rejected in both the first and second experiments. The results indicate that there is higher consensus when risk assessments are made with respect to a specific audit objective within an account

as compared to risk assessments made with respect to the overall account. The results indicate that as we move towards a more representative judgment task agreement across auditors increases. This finding was obtained across two dissimilar experiments using different measures of consensus.

The findings have implications for both prior and future research efforts. When the purpose of a research effort is to obtain a better understanding of the auditor decision process the judgment task should become an important consideration in both the design and interpretation of the study.

The final research question was addressed by the first experiment. The examination of the relative importance of risk component cues was exploratory. No a priori research hypothesis was specified for this research question. The primary objective of the first experiment was to derive a smaller set of risk component cues that would be manipulated in the second experiment.

The results indicate that many cues are considered by auditors when evaluating the respective risk components. Moreover, the results indicate that auditors' risk assessments are differentially affected by the various risk cues. The results show the high level of risk auditors perceive with respect to the valuation objective. The relative rankings of risk cues derived from this study will be useful to both practitioners and researchers.

The findings highlight the care that must be exercised when evaluating previous studies which examined the relative importance of risk cues. For example, a study previously discussed in the literature

review, found personnel related problems to have relatively low importance ratings. This finding was rather disturbing considering the results of Hylas and Ashton [1982] and others, who found personnel related problems to be one of the primary causes of error. This finding could have occurred because of the judgment task employed in the study. The judgment task abstracted significantly from the real judgment task. Auditors were required to evaluate risk cues at a general audit client level. The current study required auditors to evaluate risk cues using a more realistic judgment task and found personnel related problems to be of relatively high importance. This again, emphasizes the care that must be exercised when evaluating studies which significantly abstract from the real judgment task. Finally, the first experiment indicates that auditors not only consider inherent risk factors but these factors are very important in the risk assessment process.

6.2 Contributions and limitations of research effort

While considerable prior research exists with regard to the components of the audit risk model, little empirical research exists with regard to the effect of these factors on the overall assessment of audit risk. The current study has tried to bridge this gap by examining the effect of expectations of errors, analytical review risk and tests of details on the overall assessment of audit risk. Employing a very detailed and highly representative case study, the current study empirically tested the audit risk model as a descriptive theory of auditor behavior. Similar to the manner in which Bayes'

theorem has been used and replaced by heuristics and biases as a descriptive model of human judgment under uncertainty (Kahneman, Slovic and Tversky, 1982), eventually the audit risk model may be modified or replaced as a model of auditor risk judgment (Libby et al., 1985).

The current study provides information on the effect of the judgment task on auditor decisions. The current study examined auditors risk assessments at two levels of aggregation. Approximately half of the subjects were required to make their risk assessments with respect to a specific account balance while the other half were required to make their risk assessments with respect to a specific audit objective within the account. Similar to previous empirical research this study showed that judgment is affected by the representativeness of the task (See Einhorn & Hogarth, 1981).

The current study also provides evidence on the relative importance auditors attach to various risk factors. Furthermore, the findings of the current study suggest that auditors consider the differential reliability of audit procedures when evaluating audit risk. Psychologists have indicated that people, in some situations, seem to ignore the reliability of data (See Kahneman, Slovic and Tversky, 1982).

Similar to other empirical studies, the research design of the current study has some limitations. One limitation relates to the generalizability to other situations. The experimental design of this study required a large number of cases to be evaluated by the auditors. For this reason the case materials were limited in their scope of application to avoid overloading the participants. The risk

assessments made by the auditors were related to one specific account (accounts receivable) and one specific industry. Additionally, the manipulation of independent variables was not necessarily representative. Nonzero correlations between the independent variables which exist in nature were not taken into account. Finally, the study was limited to individual audit judgments. The review procedures which normally are a part of the audit process were not incorporated into the current study. It is possible that the auditors would follow a different composition rule given a different situation.

Another limitation of the current study is the problem of demand characteristics. Allowing the auditors to see the manipulation to the independent variables may have resulted in the auditors acting differently than they would under normal circumstances. This problem is partially mitigated by not allowing the participants to know the exact form of the research question.

Finally, the results of the current study cannot be generalized beyond the type of auditors who participated in this study. Only "Big-Eight" auditors were used by the current study, another group of auditors might act differently than those who participated in this study. As is the case with all empirical studies, replications are needed to assess the pervasiveness and robustness of the findings of the current study.

6.3 Suggestions for future research

The empirical findings of the current study provide direction for future research endeavors. First, research concerned with the effect

of the aggregation level on auditor judgments should be continued. The results of the current study suggest that auditors combine expectations of errors, analytical review risk and tests of details risk in an additive (linear) fashion. This outcome occurred whether assessments were made with respect to an account balance or with respect to a specific audit objective within the account. Before any definitive conclusions can be reached about the composition rule followed by auditors, more behavioral research is required to determine the influence of the aggregation level on risk assessments. Auditors might follow a multiplicative composition rule at finer levels of aggregation.

Second, the current study could be extended to examine another account balance or audit objective. In the current study auditors were required to make risk assessments either with respect to the accounts receivable balance or with respect to the valuation of accounts receivable. A different account such as inventory or a different audit objective such as existence could be used to determine whether the current research findings hold across different accounts and audit objectives.

Third, the current study could be extended to control for practice or experience differences across auditors. The current study required auditors to make risk assessments with respect to a specific manufacturing company. Auditors for the current study were selected based primarily on their availability. Instead, auditors could be selected based on their manufacturing experience. This would result in the practice or experience variable being a controlled, rather than

measured variable. This extension would enable us to better control for practice effects.

Fourth, the current study could be extended to examine risk assessments in another industry. The current study required auditors to make risk assessments with respect to a specific manufacturing company. A different industry such as financial institutions could be examined to determine whether the current research findings hold across different industries.

Finally, the risk assessments made by the auditors could be extended to include other groups of decision makers. The current study utilized audit managers from six "Big-Eight" national accounting firms. The case instruments could be given to students or senior auditors to assess the effect of experience on these risk assessments. Comparisons of the account level and audit objective level risk assessments made by the audit managers to the same risk assessments made by students would allow us to see if knowledge differences cause any difference between the two groups.

6.4 Summary

In summary, the current study was concerned with auditor risk assessments. Two interrelated experiments were conducted. The first experiment was concerned with determining the relative importance of various sources of audit evidence, while the second experiment was concerned with how the sources of evidence were integrated into an overall risk assessment. The judgment task developed and employed was representative, in most important aspects, to the environment found in

nature. Furthermore, this judgment task was more representative than the judgment task employed by previous auditing studies.

The current study contributes towards describing the relative importance of risk factors as well as how these risk factors are integrated into an overall assessment of risk. Assuming that it is desirable to process risk components in a multiplicative fashion changes must be made to either the methods of training auditors or the techniques employed by auditors. Before any definitive conclusions can be reached future research is needed with regard to the effect of decomposition on auditor judgments. The findings also highlight the care that must be exercised when evaluating prior and future research efforts. The results indicate that both auditor judgments and consensus are affected by the judgment task. If the objective of a research effort is to describe auditor behavior, care must be exercised to design a task which is representative of the judgment task found in nature.

APPENDICES

APPENDIX A

EXPERIMENT I INSTRUMENT

**Complete Materials for Account Level Instrument and
Inserts for Objective Level Instrument**

**QUESTIONNAIRE
FOR
A U D I T R I S K E V A L U A T I O N**

FOR A STUDY IN AUDIT RISK

By

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GENERAL INSTRUCTIONS

This questionnaire consists of three sections. The first section contains financial statements and other information pertaining to Briggs & Stratton Corporation. The background information provides a frame of reference for evaluating the items presented in the second section. You should review the background information to obtain a general understanding of the client, however, **a detailed analysis is not required**. You may refer back to this information at any time during the exercise. After reviewing this information, please turn to the second section of the questionnaire.

The second section contains a list of individual items which may be relevant in evaluating components of audit risk -- expectations of errors, analytical review risk, and tests of details risk. Your task is to indicate how important these individual items are in relation to your assessment of these risk components. There are no right or wrong answers. You may evaluate the individual items in any order and you may at any time go back and change your evaluations. The questionnaire is designed to elicit information pertinent to the assessment of audit risk only with respect to accounts receivable. After you finish this section, please write any comments you would like to make about the research material.

The final section requests demographic information of you. The entire task is estimated to take about two hours of your time. Upon completion, please return the booklet in the enclosed envelope. Thank you very much for your participation in this study.

The Briggs & Stratton Corporation was randomly selected from all publicly traded companies. There is nothing about the Company's organization or operations that bears on the use of their financial statements in this research. All information about the Company is obtained from its publicly available 1987 annual report. No alterations have been made to the financial information as presented in the annual report.

SECTION ONE

BACKGROUND INFORMATION

In evaluating the items presented, it is important to assume that you are performing a preliminary evaluation of the accounts receivable area for a new audit client. The pertinent information of this audit was obtained from preliminary meetings with the client and the prior year's audited financial statements.

Prior audits: Previous audits (performed by other independent auditors) have resulted in unqualified opinions being issued on the financial statements of Briggs & Stratton Corporation.

Exchange listing: The common stock of Briggs & Stratton Corporation is listed on the New York Stock Exchange.

Nature of business: Briggs & Stratton Corporation is the world's largest producer of air-cooled engines for outdoor power equipment and locks for automobiles and trucks. The Company designs, manufactures, markets, and services these products for original equipment manufacturers (OEM) worldwide.

The Company manufactures several air-cooled four-cycle gasoline engines, ranging from 2 to 18 horsepower, and a 1000 watt electric engine. Additionally, the Company sells two-cycle gasoline engines manufactured to specification by another manufacturer. Engines, parts and related products accounted for 93% of fiscal 1987 sales. The lawn and garden equipment industry accounted for over 90% of fiscal 1987 OEM engine sales. The engines are primarily installed on walk-behind and riding lawn mowers and garden tillers. The engines are also used to power snow throwers, garden tractors, lawn edgers, vacuums and shredder-grinders.

The remaining 10% of fiscal 1987 OEM engine sales were to manufacturers of other powered equipment including generators, pumps and a variety of other items, primarily for construction and agricultural applications. A small percentage of these industrial/commercial products are sold directly to end-users.

The company designs, manufactures, sells, and services automotive locks and related products for the major North American car and truck companies. Automotive locks manufactured by the company are ignition switches, steering column locks, glove box locks, deck lid locks, door locks, gas cap locks, spare tire locks, burglar alarm locks, and storage compartment locks. The Company also manufactures door handles, compartment latches, precision components for other lock manufacturers, and locks for construction equipment, lawn and garden equipment, and marine hardware. Automotive locks and related products accounted for approximately 7% of fiscal 1987 sales.

Manufacturing: The Company's manufacturing facilities are located in Glendale, Menomonee Falls, Wauwatosa, and West Allis, Wisconsin and Murray, Kentucky. The company manufactures its own ductile and grey iron and aluminum castings and a high percentage of other major components, such as carburetors, ignition systems, starters and alternators. Global sourcing is used for piston rings, spark plugs and valves and smaller quantities of other components.

Sales: OEM engines and lock sales are made through the Company's own sales force by direct calls on customers. Service and replacement parts are sold to independent Central Service Distributors. The company has distribution centers located in West Germany, the United Kingdom and Australia to support international sales.

Product development: During fiscal 1987 the Company introduced their new line of Vanguard overhead valve engines for the industrial/commercial and premium segments of the market. The first of these new engines, a 14 horsepower V-twin manufactured by the Company's Japanese joint venture, became available during fiscal 1988.

Other events: During fiscal 1986 the Company entered into two joint ventures. The first was a joint venture with Daihatsu Motor Company to produce a new line of Briggs & Stratton engines at a plant near Osaka, Japan. The second was a joint venture formed to build cast iron engines with Puling Machinery Works at a new factory in Chongqing, China.

Briggs & Stratton Corporation
Consolidated Statements of Income
(000's omitted except per share data)

For the Years Ended June 30, 1987 and 1986

	<u>1987</u>	<u>1986</u>
Net sales	\$ 784,665	\$ 745,831
Cost of goods sold	<u>673,047</u>	<u>621,423</u>
Gross profit on sales	\$ 111,618	\$ 124,408
Engineering, selling, general and administrative expenses	<u>65,193</u>	<u>63,713</u>
Income from operations	46,425	60,695
Other income (expense), net	<u>(861)</u>	<u>1,235</u>
Income before provision for income taxes	\$ 45,564	\$ 61,930
Provision for income taxes	<u>18,950</u>	<u>27,850</u>
Net income	<u>\$ 26,614</u>	<u>\$ 34,080</u>
Net income per share	<u>\$ 1.84</u>	<u>\$ 2.36</u>

Briggs & Stratton Corporation
Consolidated Statements of Retained Earnings
(000's omitted)

For the Years Ended June 30, 1987 and 1986

	<u>1987</u>	<u>1986</u>
Balance at beginning of year	\$ 251,218	\$ 240,280
Net income	26,614	34,080
Cash dividends paid, \$1.60 per share in each year	<u>(23,142)</u>	<u>(23,142)</u>
Balance at end of year	<u>\$ 254,690</u>	<u>\$ 251,218</u>

The accompanying notes to consolidated financial statements
are an integral part of these statements.

Briggs & Stratton Corporation
Consolidated Balance Sheets
(000's omitted)

June 30, 1987 and 1986

Assets		<u>1987</u>	<u>1986</u>
Current assets:			
Cash		\$ 5,407	\$ 4,229
Certificates of deposit		22,036	38,046
Accounts receivable, less reserves of \$278 and \$258, respectively		54,979	52,204
Inventories			
Finished products and parts		28,109	29,076
Work in process		34,464	32,807
Raw materials		<u>4,460</u>	<u>4,849</u>
Total Inventory		67,033	66,732
Future income tax benefits		6,143	5,338
Prepaid employee health care		10,735	12,465
Prepaid expenses		<u>11,157</u>	<u>9,261</u>
Total Current Assets		\$ 177,490	\$ 188,275
Prepaid pension cost		486	-
Plant and equipment:			
Land and land improvements		9,697	9,651
Buildings		99,759	99,292
Machinery and equipment		324,210	291,221
Construction in progress		<u>36,920</u>	<u>27,508</u>
		470,586	427,672
Less - accumulated depreciation and unamortized investment tax credit		<u>196,683</u>	<u>179,325</u>
Total plant and equipment, net		<u>273,903</u>	<u>248,347</u>
Total assets		<u>\$ 451,879</u>	<u>\$ 436,622</u>
Liabilities and Shareholders' Investment			
Current liabilities:			
Accounts payable		38,921	31,145
Foreign loans		11,758	11,656
Accrued liabilities		43,938	43,130
Federal and state income taxes		<u>5,592</u>	<u>8,490</u>
Total current liabilities		\$ 100,209	\$ 94,421
Deferred income taxes		45,064	38,614
Accrued employee benefits		<u>10,346</u>	<u>10,070</u>
Total liabilities		\$ 155,619	\$ 143,105
Shareholders' Investment:			
Common stock, \$3.00 par value; 15,000,000 shares authorized; 14,463,500 issued and outstanding in 1987 and 1986		43,391	43,391
Retained earnings		254,690	251,218
Cumulative translation adjustments		<u>(1,821)</u>	<u>(1,092)</u>
Total shareholders' investment		\$ 296,260	\$ 293,517
Total liabilities and shareholders' investment		<u>\$ 451,879</u>	<u>\$ 436,622</u>

The accompanying notes to consolidated financial statements
are an integral part of these statements.

Briggs & Stratton Corporation
Consolidated Statements of Changes in Financial Position
(000's omitted)

For the Years Ended June 30, 1987 and 1986

	<u>1987</u>	<u>1986</u>
Cash and certificates of deposit, beginning	\$ 42,275	\$ 24,999
Cash provided (used) from operations:		
Net Income	26,614	34,080
Depreciation	24,502	21,508
(Increase) decrease in accounts receivable	(2,775)	4,285
(Increase) decrease in inventories	(301)	2,878
(Increase) decrease in other current assets	(971)	3,196
Increase (decrease) in current liabilities	5,788	5,574
Other, net, primarily deferred income taxes	6,240	9,332
Total provided from operations	59,097	80,853
Cash was used for:		
Additions to plant and equipment, net of		
investment tax credit in 1986	50,058	39,615
Dividends paid	23,142	23,142
Foreign currency translation adjustment	729	820
Total used	73,929	63,577
Net cash provided (used)	(14,832)	17,276
Cash and certificates of deposit, ending	<u>\$ 27,443</u>	<u>\$ 42,275</u>

The accompanying notes to consolidated financial statements
are an integral part of these statements.

Briggs & Stratton Corporation
Notes to Consolidated Financial Statements

For the Years Ended June 30, 1987 and 1986

(1) Summary of Significant Accounting Policies:

The significant accounting policies followed by Briggs & Stratton Corporation and subsidiaries in the preparation of these financial statements, as summarized below, are in conformity with generally accepted accounting principles.

Principles of consolidation: The consolidated financial statements include the accounts of the Company and its wholly-owned domestic and foreign subsidiaries after elimination of intercompany accounts and transactions.

Inventories: Inventories are stated at cost, which does not exceed market. The last-in, first-out (LIFO) method was used for determining the cost of approximately 94% of total inventories at June 30, 1987 and 98% at June 30, 1986. The remaining portion of the inventories was valued using the first-in, first-out (FIFO) method. If the FIFO inventory valuation method had been used exclusively, inventories would have been \$34,158,000 and 35,543,000 higher in the respective years. The LIFO inventory adjustment was determined on an overall basis and accordingly each class of inventory reflects an allocation based on the FIFO amounts.

Prepaid employee health care: During the 1987 and 1986 fiscal years, the Company made payments to its Voluntary Employee Benefit Association (VEBA). The VEBA is a trust created to provide for payment of employee health benefits. Tax-deductible contributions of \$12,975,000 in 1987 and \$16,185,000 in 1986 were made to the trust, of which \$10,735,000 and \$12,465,000 were shown in the caption Prepaid employee health care in the respective years.

Plant and equipment and depreciation: Plant and equipment is stated at cost, and depreciation is computed using the straight-line method at rates based upon the estimated useful lives of the assets. Expenditures for repairs and maintenance are charged to expense as incurred; expenditures for major renewals and betterments, which significantly extend the useful lives of existing plant and equipment, are capitalized and depreciated. Upon retirement or disposition of plant and equipment, the cost and related accumulated depreciation are removed from the accounts and the resulting gain or loss is recognized in income.

Investment tax credits: The Company follows the deferral method of accounting for the Federal investment tax credit. Prior to the elimination of this credit in 1986, it was recorded as an addition to accumulated depreciation and was amortized over the estimated useful lives of the related assets via a reduction of depreciation expense. In 1987, coincident with the change in the tax law, the company changed its method to amortizing the remaining balance of the tax credit over five years on a straight-line basis.

The deferred investment tax credits arising from the purchase of depreciable assets, prior to the elimination of this option, totaled \$4,418,000 in 1986. The amounts amortized into income was \$3,106,000 in 1987 and 1,925,000 in 1986. At June 30, 1987 and 1986 unamortized deferred investment tax credit aggregated \$12,246,000 and \$15,532,000 respectively.

Future income tax benefits: Future income tax benefits, classified as current asset, represent the tax effect of timing differences relating to current assets and current liabilities. These result in a higher taxable income than recorded in the accounts for financial reporting purposes.

Notes...

Deferred income taxes: Deferred income taxes, classified as a noncurrent liability, provide for the tax effects of timing differences relating to noncurrent assets and noncurrent liabilities resulting in the recognition of certain income and expense amounts in different periods for tax and financial reporting purposes. These timing differences principally result from additional tax deductions available due to the use of accelerated methods of depreciation and shorter asset lives for tax purposes and are offset in part by accrued employees benefits which are not tax deductible until paid.

Research and development costs: Expenditures relating to the development of new products and processes, including significant improvements and refinements to existing products, are expensed as incurred. The amounts charged against income were \$10,314,000 in 1987 and 10,400,000 in 1986.

Accrued employee benefits: The Company's life insurance program includes payment of a death benefit to beneficiaries of retired employees. The Company accrues for the estimated cost of these benefits over the estimated working life of the employee. Past service costs for all retired employees have been fully provided for and the Company is accruing for the prior service costs associated with active employees over thirty years. The Company also accrues for the estimated cost of supplemental retirement and death benefit agreements with certain officers.

Foreign currency translation: Foreign currency balance sheet accounts are translated into United States dollars at the rates of exchange in effect at fiscal year-end. Income and expenses are translated at the average rates of exchange in effect during the year. The related translation adjustments are made directly to a separate component of shareholders' investment, which contained the following changes during the two fiscal years:

	Gain (Loss)	
	1987	1986
Balance at beginning of year	\$ (1,092,000)	\$ (272,000)
Translation adjustment for year	(729,000)	(820,000)
Balance at end of year	<u>\$ (1,821,000)</u>	<u>\$ (1,092,000)</u>

(2) Retirement Plan and Post-Retirement Costs:

The Company has noncontributory defined benefit retirement plans covering substantially all employees. Retirement costs resulted in income of \$4,546,000 in 1987 and expense of \$4,163,000 in 1986.

The company adopted Financial Standards Board Statement No. 87, "Employers' Accounting for Pensions," in fiscal 1987. Accordingly, the Company changed its method for determining annual pension expenses for financial reporting purposes which increased net earnings by \$4.5 million. The Company, however, continues to use the Frozen Entry Age Actuarial Cost method to determine corporate contributions to the plans.

The following amounts are included in the Company's 1987 pension income:

Service cost	\$ 11,405,000
Interest cost on projected benefits	24,546,000
Actual return on plan assets	<u>(43,646,000)</u>
Asset gain deferral and the amortization of the unrecognized net assets arising from the initial application of SFAS No. 87	2,473,000
Other	<u>676,000</u>
Periodic pension cost (income)	<u>\$ (4,546,000)</u>

Notes...

The actuarial assumptions used in fiscal 1987 for the discount rate used in determining the present value of the projected benefit obligation, the expected rate of increase for future compensation levels, and the expected long term rate of return on plan assets were 8.5% and 7.0% respectively. Plan assets are stated at fair market value.

The funded status of the Company's qualified pension plans is as follows:

	June 30, 1987	July 1, 1986
Projected benefit obligations	\$ 318,322,000	\$ 295,172,000
Accumulated benefit obligations	220,017,000	209,429,000
Vested benefit obligations	186,934,000	180,224,000
Unrecognized net gains	8,873,000	-
Obligations due to window	-	676
Remaining unrecognized net assets arising from the initial application of SFAS No. 87	95,915,000	102,315,000
Estimated market value of plan assets	423,596,000	392,751,000
Prepaid pension cost	486,000	-
Accrued retirement plan	-	4,109,000

In addition to providing pension benefits described in the preceding paragraphs, the Company provides life insurance and health care benefits for substantially all retired employees. The life insurance benefit has been provided for as described in Note 1 to these financial statements. The cost of retiree health care benefits recognized as expense when claims are paid, totaled \$1,576,000 in 1987 and \$1,512,000 in 1986.

(3) Income Taxes:

The provision for income taxes consists of the following:

	1987	1986
Current:		
Federal	\$ 12,392,000	\$ 21,829,000
State	913,000	2,339,000
	13,305,000	24,168,000
Deferred	5,645,000	3,682,000
Total	<u>\$ 18,950,000</u>	<u>\$ 27,850,000</u>

The provision for deferred income taxes includes \$5,881,000 in 1987 and \$8,955,000 in 1986 in recognition of the future income tax effect of tax depreciation in excess of that recorded for financial reporting purposes. Additional amounts are included because of prepaid employee health care expenses deducted for tax purposes and not recorded as expense in the financial statements. Offsetting these amounts are certain liabilities which are on a different basis for financial reporting purposes than for tax purposes.

Notes...

A reconciliation of the effective tax rates to the U.S. statutory rate follows:

	<u>1987</u>	<u>1986</u>
U.S. statutory rate	46.0%	46.0%
State taxes, net of federal tax benefit	1.9%	2.4%
Amortization of non-taxable deferred federal investment tax credit	(3.1%)	(1.4%)
Other	(3.2%)	(2.0%)
Effective tax rate	<u>41.6%</u>	<u>45.0%</u>

(4) Industry Segments:

Certain information concerning the Company's industry segments is presented below:

	<u>1987</u>	<u>1986</u>
Sales -		
Engines and parts	\$ 730,342,000	\$ 685,259,000
Locks	<u>54,323,000</u>	<u>60,572,000</u>
	<u>\$ 784,665,000</u>	<u>\$ 745,831,000</u>
Income (loss) from operations -		
Engines and parts	\$ 48,084,000	\$ 58,310,000
Locks	<u>(1,659,000)</u>	<u>2,385,000</u>
	<u>\$ 46,425,000</u>	<u>\$ 60,695,000</u>
Assets -		
Engines and parts	\$ 372,907,000	\$ 339,726,000
Locks	29,091,000	32,160,000
Unallocated	<u>49,881,000</u>	<u>64,736,000</u>
	<u>\$ 451,879,000</u>	<u>\$ 436,622,000</u>
Depreciation expense -		
Engines and parts	\$ 22,540,000	\$ 19,805,000
Locks	<u>1,962,000</u>	<u>1,703,000</u>
	<u>\$ 24,502,000</u>	<u>\$ 21,508,000</u>
Expenditures for plant and equipment -		
Engines and parts	\$ 49,075,000	\$ 42,736,000
Locks	<u>3,297,000</u>	<u>3,552,000</u>
	<u>\$ 52,372,000</u>	<u>\$ 46,288,000</u>

Unallocated assets include cash, certificates of deposit, prepaid employee health care and other assets. Export sales for fiscal 1987 were \$123,258,000 (16% of total sales) and for fiscal 1986 \$118,799,000 (16%). These sales were principally to customers in European countries and Canada.

Sales were made to two major engine customers in amounts exceeding 10% of total sales. Sales to one of these customers totaled \$111,683,000 (14% of total sales) in fiscal 1987 and \$97,591,000 (13%) in fiscal 1986. Sales to the other major customer totaled \$100,676,000 (13% of total sales) in fiscal 1987 and \$82,402,000 (11%) in fiscal 1986.

Notes...**(5) Domestic and Foreign Loans and Lines of Credit:**

The Company has unused domestic lines of credit available at June 30, 1987 totaling \$40,000,000. These arrangements provide for borrowing amounts for short-term use at the then prevailing rate. There are no significant compensating balance requirements.

The following data relates to the domestic loans during the 1987 fiscal year:

Balance at June 30	None
Weighted average interest rate at June 30	None
Maximum outstanding at any month end	\$ 28,427,000
Average amount outstanding	\$ 8,423,000
Weighted average interest rate during the year	6.29%

The lines of credit available to the company in foreign countries are in connection with short-term borrowings and bank overdrafts used in the normal course of business. None of these arrangements had material commitment fees or compensating balance requirements.

The following information relates to the foreign loans:

	1987	1986
Balance at June 30	\$ 11,758,000	\$ 11,656,000
Weighted average interest rate at June 30	4.34%	4.94%
Maximum amount outstanding at any month end	\$ 14,844,000	\$ 14,668,000
Average amount outstanding	\$ 13,230,000	\$ 12,724,000
Weighted average interest rate during the year	4.77%	5.26%

(6) Other Income Expense:

The components of other income are:

	1987	1986
Interest income	\$ 850,000	\$ 1,873,000
Interest expense	(1,177,000)	(909,000)
Other items	(534,000)	271,000
	<u>\$ (861,000)</u>	<u>\$ 1,235,000</u>

SECTION TWO

FACTORS AFFECTING EXPECTATIONS OF ERRORS

Expectations of Errors is defined as the risk that a material misstatement will 1) occur in an account balance (inherent risk) and 2) not be prevented or detected on a timely basis by the entity's internal control structure (control risk).

This questionnaire pertains to your assessment of expectations of errors related to accounts receivable. You should disregard all issues relating to other accounts.

The following list contains a series of twenty four attributes considered in the assessment of expectations of errors. Please indicate in the space provided how much influence each attribute would have on your assessment of expectations of errors related to accounts receivable.

- 1) Changes in the general economic environment of the client's industry.

1	2	3	4	5	6	7
Not						Very
Important						Important

- 2) Number of business failures within the client's industry.

1	2	3	4	5	6	7
Not						Very
Important						Important

- 3) Changes in the client's position within the industry.

1	2	3	4	5	6	7
Not						Very
Important						Important

- 4) Level of competition in the client's industry.

1	2	3	4	5	6	7
Not						Very
Important						Important

- 5) Changes in the demand for the client's products.

1	2	3	4	5	6	7
Not						Very
Important						Important

FACTORS AFFECTING EXPECTATIONS OF ERRORS - CONTINUED

6) Dependency of customers on client's products.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

7) Concentration of sales to customers.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

8) Number of business failures in industries of client's customers.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

9) Domination of the client's top, executive management by one or a few individuals.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

10) Experience and competence of client personnel in the relevant departments.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

11) Client personnel turnover in the relevant departments.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

12) Sales compensation plans.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

FACTORS AFFECTING EXPECTATIONS OF ERRORS - CONTINUED

13) Changes in client's credit policies.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

14) Automation of client's accounting system.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

15) Separation of the credit department from the sales department.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

16) Separation of the cash receipts and the cash disbursements functions from the accounts receivable, the billing and the general ledger functions.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

17) Customer billing complaints are investigated by persons independent of the accounts receivable and billing functions.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

18) Sales invoices and credit memos are sequentially pre-number and accounted for regularly.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

FACTORS AFFECTING EXPECTATIONS OF ERRORS - CONTINUED

- 19) Prices, terms, extensions, and postings of sales invoices are periodically checked.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

- 20) Cutoff and closing procedures for revenues and accounts receivable are employed at the end of each financial reporting period.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

- 21) Journal entries crediting accounts receivable for non-cash transactions are approved by an independent executive.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

- 22) Established price lists are available and any changes in these prices are approved by responsible officials.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

- 23) Write-offs of uncollectible accounts are approved by an independent executive.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

- 24) Credit memos for goods returned by customers are approved by an independent executive.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

FACTORS AFFECTING EXPECTATIONS OF ERRORS - CONTINUED

25) List other important factors affecting expectations of errors.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

FACTORS AFFECTING ANALYTICAL REVIEW RISK

Analytical review risk is defined as the risk that the auditor's analytical review procedures and other relevant substantive procedures will not detect a material misstatement that exists in an account balance.

This questionnaire pertains to your assessment of analytical review risk related to accounts receivable. Analytical review risk is reduced by performing analytical review procedures. You should disregard all issues relating to other accounts.

The following list contains a series of ten procedures considered in the assessment of analytical review risk. Please indicate in the space provided the effectiveness of each procedure towards helping to achieve the fair presentation of accounts receivable.

- 1) Comparison of accounts receivable ending balance to prior years.

1	2	3	4	5	6	7
Not						Very
Important						Important

- 2) Comparison of allowance for doubtful accounts ending balance to prior years.

1	2	3	4	5	6	7
Not						Very
Important						Important

- 3) Comparison of bad debt expense as a percentage of net sales to prior years.

1	2	3	4	5	6	7
Not						Very
Important						Important

- 4) Reviewing relationship between average accounts receivable balance and net sales.

1	2	3	4	5	6	7
Not						Very
Important						Important

FACTORS AFFECTING ANALYTICAL REVIEW RISK - CONTINUED

5) Comparison of accounts receivable turnover to prior years.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

6) Comparison of average collection period of accounts receivable to prior years.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

7) Comparison of aging of accounts receivable to prior years.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

8) Comparison of current year write-offs to prior year write-offs.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

9) Comparison of current year write-offs to allowance for doubtful accounts.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

10) Comparison of current year write-offs to total accounts receivable balance.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

FACTORS AFFECTING ANALYTICAL REVIEW RISK - CONTINUED

- 11) List other important analytical review procedures related to accounts receivable.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

FACTORS AFFECTING TESTS OF DETAILS RISK

Tests of details risk is defined as the risk that the auditor's substantive tests of details will not detect a material misstatement that exists in an account balance assuming that it was not detected by the analytical review procedures and other relevant substantive procedures.

This questionnaire pertains to your assessment of tests of details risk related to accounts receivable. Tests of details risk is reduced by performing substantive tests of details. You should disregard all issues related to other accounts.

The following list contains a series of ten procedures considered in the assessment of tests of details risk. Please indicate in the space provided the effectiveness of each procedure towards helping to achieve the fair presentation of accounts receivable.

- 1) Reviewing accounts receivable control account for unusual items.

1	2	3	4	5	6	7
Not						Very
Important						Important

- 2) Reviewing accounts receivable for amounts due from related parties, credit balances, and unusual items.

1	2	3	4	5	6	7
Not						Very
Important						Important

- 3) Reviewing current year write-offs of accounts receivable.

1	2	3	4	5	6	7
Not						Very
Important						Important

- 4) Reviewing collectibility of receivables and determination of adequacy of allowance for doubtful accounts.

1	2	3	4	5	6	7
Not						Very
Important						Important

FACTORS AFFECTING TESTS OF DETAILS RISK - CONTINUED

- 5) Testing of clerical accuracy (i.e. footing journals and tracing postings to general ledger and accounts receivable ledger).

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

- 6) Confirmation of accounts receivable using positive confirmations.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

- 7) Confirmation of accounts receivable using negative confirmations.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

- 8) Examination of subsequent collections.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

- 9) Examination of evidence related to sales authorizations and shipment of goods.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

- 10) Testing sales cutoff.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

FACTORS AFFECTING TESTS OF DETAILS RISK - CONTINUED

- 11) List other important substantive tests of details procedures related to accounts receivable.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not						Very
Important						Important

SECTION THREE

REQUEST FOR DEMOGRAPHIC INFORMATION**1) Location of Employment:**

City _____, State _____

2) Firm of Employment? _____**3) What is your age?** _____**4) Experience (round to the nearest year):**

- a) Number of years of business experience _____
 b) Number of years of auditing experience _____
 c) Number of years of public accounting experience _____
 d) Number of years of Big Eight accounting experience _____

5) Circle any of the following certificates you have earned:

CPA CIA CMA

Other _____

6) What was your undergraduate major? _____**7) Do you have a graduate degree?** Yes _____ No _____

If yes, circle the graduate degrees which you have received?

MBA with accounting concentration

MBA with concentration in nonaccounting area

MS in accounting

Other(s) _____

8) Circle the job title that most accurately describes your position:

Partner/Principal Manager Supervisor Senior Staff

Other _____

9) How many years have you been at your present job title? . . . _____**10) Please classify your audit client experience into the following categories:**

Non-Manufacturing companies _____%

Manufacturing companies having less than \$100 million in sales _____%

Manufacturing companies having between \$100-500 million in sales _____%

Manufacturing companies having over \$500 million in sales _____%

100%

REQUEST FOR DEMOGRAPHIC INFORMATION - CONTINUED

- 11) What portion of your audit time is spent on clients where the audit approach could be characterized as a control reliance approach?

Control reliance approach	_____	%
Not a control reliance approach	_____	%
		100%

- 12) How interesting did you find your participation in this project?

Very interesting	_____
Reasonably interesting	_____
Of little interest	_____
Of no interest	_____

- 13) In total, how long did it take you to complete this project? _____

Inserts for Objective Level Instrument**FACTORS AFFECTING EXPECTATIONS OF ERRORS**

Expectations of Errors is defined as the risk that a material misstatement will 1) occur in an objective (inherent risk) and 2) not be prevented or detected on a timely basis by the entity's internal control structure (control risk).

This questionnaire pertains to your assessment of the expectations of errors related to the valuation of accounts receivable (e.g. accounts receivable is recorded at an appropriate carrying value). You should disregard all issues related to other objectives (i.e. completeness, existence, disclosure, etc).

The following list contains a series of twenty four attributes considered in the assessment of expectations of errors. Please indicate in the space provided how much influence each attribute would have on your assessment of expectations of errors related to the valuation of accounts receivable.

FACTORS AFFECTING ANALYTICAL REVIEW RISK

Analytical review risk is defined as the risk that the auditor's analytical review procedures and other relevant substantive procedures will not detect a material misstatement that exists in an objective.

This questionnaire pertains to your assessment of analytical review risk related to the valuation of accounts receivable (e.g. accounts receivable is recorded at an appropriate carrying value). Analytical review risk is reduced by performing analytical review procedures. You should disregard all issues related to other objectives (i.e. completeness, existence, disclosure, etc).

The following list contains a series of ten procedures considered in the assessment of analytical review risk. Please indicate in the space provided the effectiveness of each procedure towards helping to achieve the correct valuation of accounts receivable.

FACTORS AFFECTING TESTS OF DETAILS RISK

Tests of details risk is defined as the risk that the auditor's substantive tests of details will not detect a material misstatement that exists in an objective assuming that it was not detected by the analytical review procedures and other relevant substantive procedures.

This questionnaire pertains to your assessment of tests of details risk related to the valuation of accounts receivable (e.g. accounts receivable is recorded at an appropriate carrying value). Tests of detail risk is reduced by performing substantive tests of details. You should disregard all issues related to other objectives (i.e. completeness, existence, disclosure, etc).

The following list contains a series of ten procedures considered in the assessment of tests of details risk. Please indicate in the space provided the effectiveness of each procedure towards helping to achieve the correct valuation of accounts receivable.

APPENDIX B

EXPERIMENT II INSTRUMENT

**Complete Case Materials for Account Level Instrument and
Inserts for Objective Level Instrument**

**CASE STUDIES
FOR
AUDIT RISK EVALUATION**

FOR A STUDY IN AUDIT RISK

By

**Frank Buckless
Ph.D. Candidate**

**Michigan State University
Graduate School of Business Administration
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General Instructions

The cases presented in this booklet have been prepared to represent realistic audit situations concerned with the assessment of audit risk. The first section of this booklet contains financial statements and other information pertaining to Briggs & Stratton Corporation ("the client"). This information is the same for all cases. **Before reviewing this information, you should turn to the second section of the booklet and scan the information and cases presented.** This will enable you to understand the task required of you before absorbing the background information. The background information provides a frame of reference for evaluating the cases presented in the second section. You should review the background information to obtain a general understanding of the client. You may refer back to this information at any time during the exercise.

The second section contains eight cases you will be required to evaluate. The first subsection contains a partial planning memorandum, a description of the client's control system, flowcharts and an audit program for the revenue cycle. This information is unchanging for all cases. The next subsection contains case information which changes for each case. Your task is to evaluate the audit risk of these cases related to accounts receivable. You should not critically evaluate the planning memorandum, flowcharts and other system documentation, but merely use them to familiarize yourself with the client. The cases are designed to elicit information about audit risk with respect to **accounts receivable only**. After you finish this section, please write any comments you would like to make about the research material.

The final section requests demographic information of you. The entire task is estimated to take about two hours of your time. Upon completion, please return the booklet in the enclosed envelope. Thank you very much for your participation in this study.

The Briggs & Stratton Corporation was randomly selected from all publicly traded companies. There is nothing about the Company's organization or operations that bears on the use of their financial statements in this research. The information provided in section two does not reflect actual details of the Company's organization or operations. **This information was created for purposes of this study only.**

SECTION ONE

BACKGROUND INFORMATION

In evaluating the cases presented, it is important to assume that you are performing a preliminary evaluation of the accounts receivable area for a new audit client. The preliminary client information and audit program was prepared by Dave Kerr, the senior-in-charge. No compliance or substantive procedures have been performed for the current year audit. Your task is to evaluate the nature, extent and timing of the tentative audit plans proposed by the senior. **You should evaluate each case independently.**

Prior audits: Previous audits (performed by other independent auditors) have resulted in unqualified opinions being issued on the financial statements of Briggs & Stratton Corporation.

Exchange listing: The common stock of Briggs & Stratton Corporation is listed on the New York Stock Exchange.

Nature of business: Briggs & Stratton Corporation is the world's largest producer of air-cooled engines for outdoor power equipment and locks for automobiles and trucks. The Company designs, manufactures, markets, and services these products for original equipment manufacturers (OEM) worldwide.

The Company manufactures several air-cooled four-cycle gasoline engines, ranging from 2 to 18 horsepower, and a 1000 watt electric engine. Additionally, the Company sells two-cycle gasoline engines manufactured to specification by another manufacturer. Engines, parts and related products accounted for 93% of fiscal 1987 sales. The lawn and garden equipment industry accounted for over 90% of fiscal 1987 OEM engine sales. The engines are primarily installed on walk-behind and riding lawn mowers and garden tillers. The engines are also used to power snow throwers, garden tractors, lawn edgers, vacuums and shredder-grinders.

The remaining 10% of fiscal 1987 OEM engine sales were to manufacturers of other powered equipment including generators, pumps and a variety of other items, primarily for construction and agricultural applications. A small percentage of these industrial/commercial products are sold directly to end-users.

The major domestic competitors of the Company in engine manufacturing are Tecumseh Products Company, Kohler Company, Teledyne Wisconsin Motor Company and Onan Corporation. The Major foreign competitor is Honda Motor Co. Ltd. Other Japanese small engine manufactures are becoming more aggressive and competitive.

The Company designs, manufactures, sells, and services automotive locks and related products for the major North American car and truck companies. Automotive locks manufactured by the Company are ignition switches, steering column locks, glove box locks, deck lid locks, door locks, gas cap locks, spare tire locks, burglar alarm locks, and storage compartment locks. The Company also manufactures door handles, compartment latches, precision components for other lock manufacturers, and locks for construction equipment, lawn and garden equipment, and marine hardware. Automotive locks and related products accounted for approximately 7% of fiscal 1987 sales.

Major competitors of the Company in lock manufacturing are Hurd Lock & Manufacturing Company and All-Lock Company, Inc.

Manufacturing: The Company's manufacturing facilities are located in Glendale, Menomonee Falls, Wauwatosa, and West Allis, Wisconsin and Murray, Kentucky. The Company manufactures its own ductile and grey iron and aluminum castings and a high percentage of other major components, such as carburetors, ignition systems, starters and alternators. Global sourcing is used for piston rings, spark plugs and valves and smaller quantities of other components.

Sales: OEM engines and lock sales are made through the Company's own sales force by direct calls on customers. Service and replacement parts are sold to independent Central Service Distributors. The Company has distribution centers located in West Germany, the United Kingdom and Australia to support international sales.

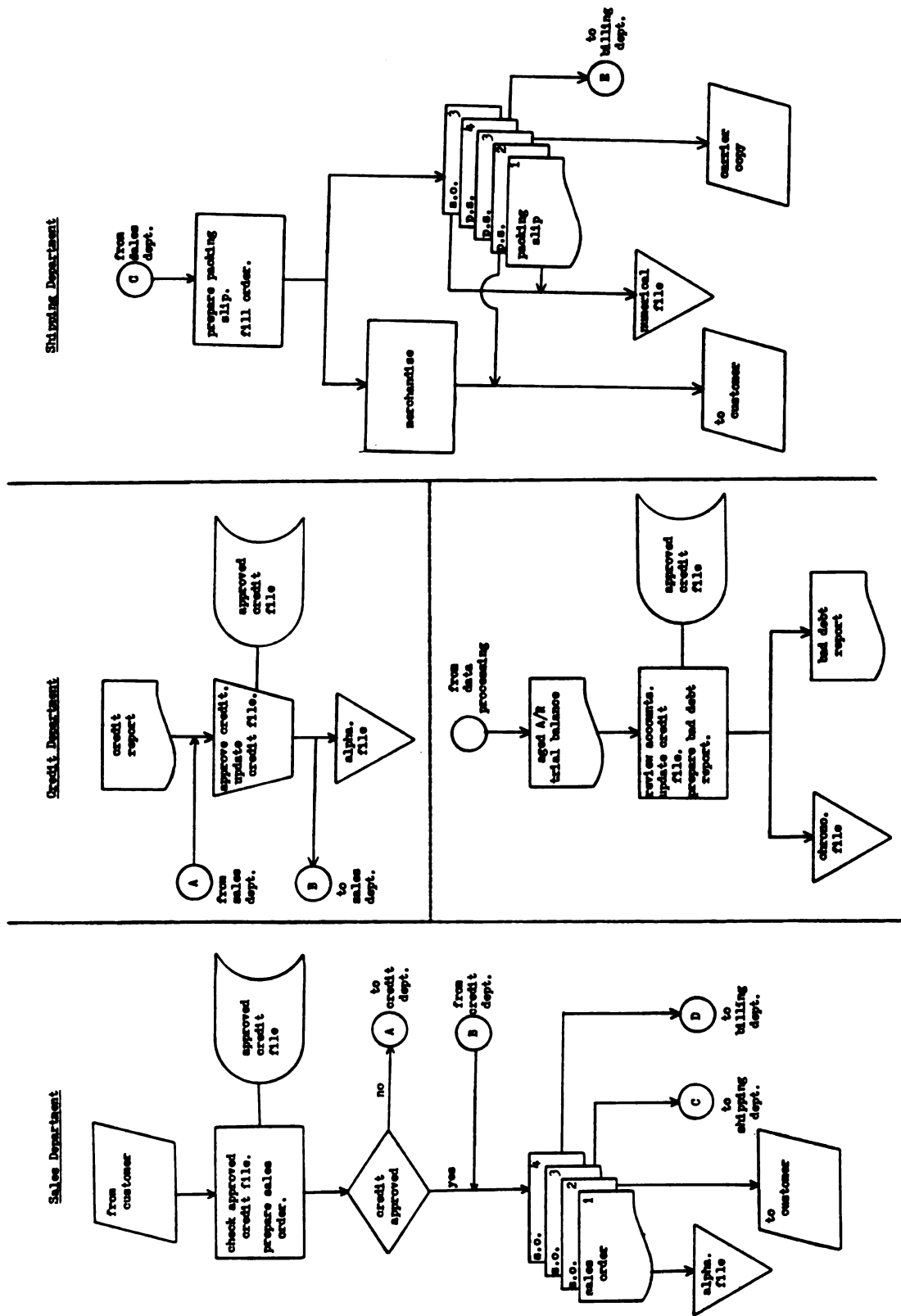
Product development: During fiscal 1987 the Company introduced their new line of Vanguard overhead valve engines for the industrial/commercial and premium segments of the market. The first of these new engines, a 14 horsepower V-twin manufactured by the Company's Japanese joint venture, became available during fiscal 1988.

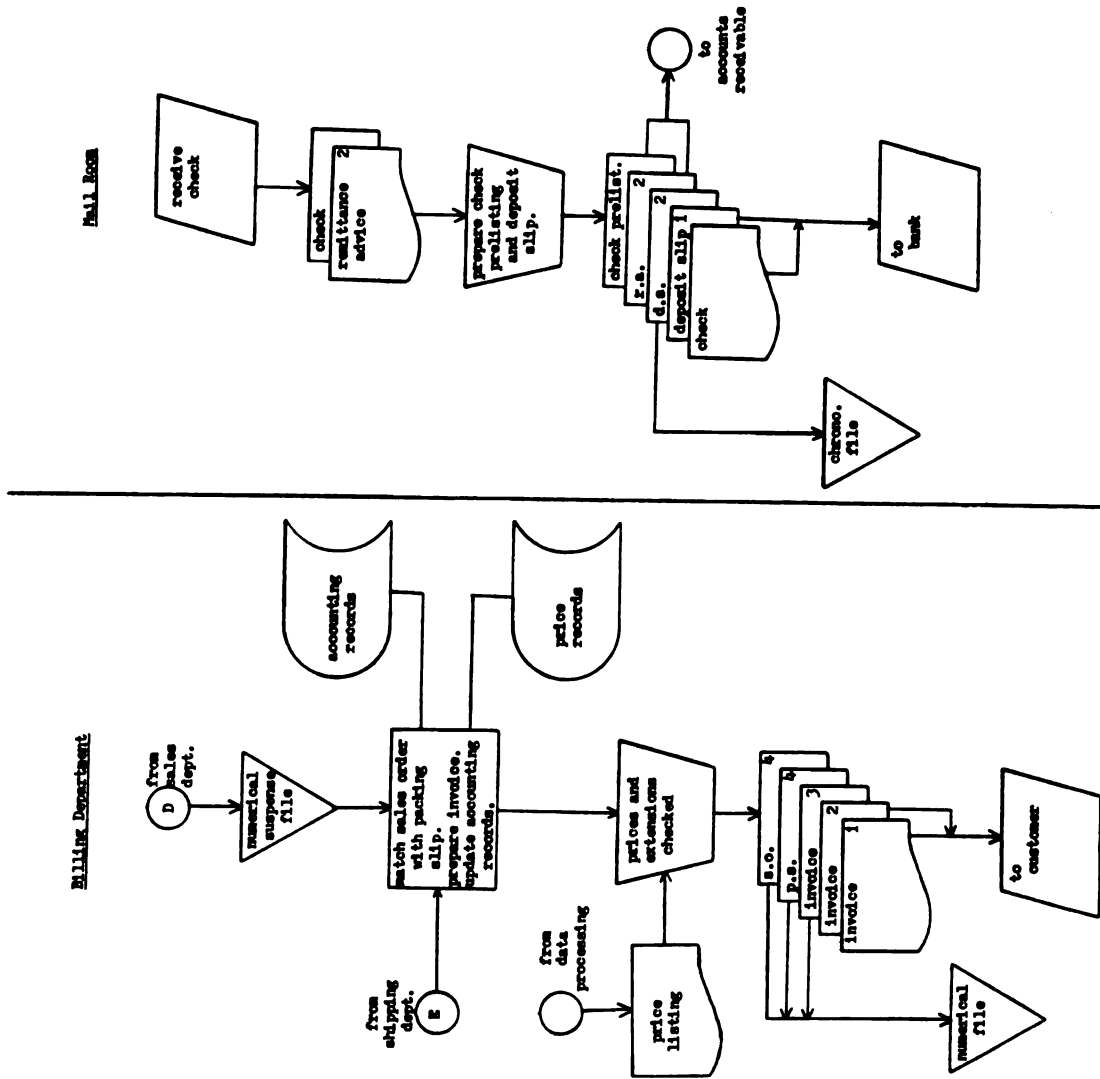
Other events: During fiscal 1986 the Company entered into two joint ventures. The first was a joint venture with Daihatsu Motor Company to produce a new line of Briggs & Stratton engines at a plant near Osaka, Japan. The second was a joint venture formed to build cast iron engines with Puling Machinery Works at a new factory in Chongqing, China.

1987 Comparative Financial Statements

The 1987 comparative financial statements are presented in APPENDIX A

SECTION TWO





**Briggs & Stratton Corporation
Revenue Cycle Procedures**

Sales Department

- 1) All orders are received over the phone by the Company's sales force. Orders are entered into a computer terminal by the sales person. The sales order amount is automatically checked against the approved credit listing maintained on the computer.
- 2) A computerized four-part sales order is printed. Credit approval is indicated on the sales order and initialed by the sales person. The sales orders are numerically sequenced.
- 3) If the customer does not have approved credit for the sale amount, the sales orders are forwarded to the credit department for approval.

Credit Department

- a) The credit manager obtains a credit report on the customer.
- b) The credit manager reviews the credit report. If credit is approved, the manager updates the credit listing file, initials the sales order and forwards it to the sales department.
- c) If credit is not approved, the customer is contacted and other terms are arranged or the sales order is voided.
- d) The credit report is filed alphabetically in the credit department.

Sales Department

- 4) If customer has approved credit for sale amount, the four parts of the sales order are distributed by the sales department as follows:

No. 1 is filed alphabetically in the sales department.

No. 2 is mailed to the customer.

No. 3 is distributed to the shipping department.

No. 4 is distributed to the billing department.

Shipping Department

- 5) A computerized four-part packing slip is printed. The packing slips are numerically sequenced. Orders are filled by warehousemen, using the packing slip. Items short or not in stock are lined out and initialed by the warehousemen. Filling the order includes complete preparation for shipment. Method of shipping depends on size and weight of shipment.

**Briggs & Stratton Corporation
Revenue Cycle Procedures**

- 6) The sales order and packing slips are distributed by the shipping department as follows:
- No. 1 packing slip and No. 3 sales order are filed numerically in the shipping department.
 - No. 2 packing slip is included with the merchandise delivered to the customer.
 - No. 3 packing slip is given to the carrier.
 - No. 4 packing slip is distributed to the billing department.

Billing Department

- 7) The billing clerk matches the packing slip from the shipping department with the sales order. A computerized three-part invoice is prepared and the accounting records are updated.
- 8) An out of stock report is prepared from the packing slip by the billing clerk for use by the production manager.
- 9) The billing clerk checks the prices and extensions on the invoice using the most current selling prices, initializes the invoice and distributes the documents. The selling prices are kept in a loose-leaf notebook for general office use.
- 10) The invoices, packing slip and sales order are distributed by the billing department as follows:
- No. 1 and No. 2 invoice are sent to the customer. The second is used as a remittance advice.
 - No. 3 invoice, No. 4 packing slip and No. 4 sales order are numerically filed in the billing department.
- 11) Un-matched sales orders and missing invoices are periodically reviewed by the billing clerk, a reconciliation is prepared and follow-up is documented.

Credit Department

- 12) The credit manager reviews periodically the aged accounts receivable trial balance. During this review, the manager makes general information notes and notes for follow-up calls to customers for collection, credit limit, etc. These notes are destroyed after they are no longer needed.

**Briggs & Stratton Corporation
Revenue Cycle Procedures**

- 13) Upon completion of the review, the manager updates the approved credit list, prepares a list of accounts to be written off as uncollectible and attaches documentation of collection efforts, writes explanations for all accounts over sixty days old, and forwards report to the controller.

Accounts Receivable Department

- 14) Statements are sent to customers monthly by an accounts receivable clerk. All questions are referred to the billing department.

Mail Room

- 15) Checks are received by the mail room and are immediately stamped with a restrictive endorsement.
- 16) A mail room clerk prepares a check prelisting and two-part deposit slip for all checks received during the day. Deposits are made daily at the end of the day.
- 17) The deposit slips, check prelisting, remittance advice and check are distributed by the mail room as follows:

No. 1 deposit slip is included with the check deposited in the bank.
No. 2 deposit slip is filed chronologically by the mail room.
No. 2 remittance advice and check listing are sent to the accounting department where the accounting records are updated.

Accounting Department

- 18) The bank account is reconciled monthly by an accounting clerk.

Briggs & Stratton Corporation **Partial Planning Memorandum**

Nature of Business

See Background Information.

Condensed Financial Statements

The client's condensed financial statements as of March 27, 1988 are as follows:

Condensed Income Statement **For the Three Quarters Ended March 27, 1988** **(000's omitted)**

Net Sales	\$ 680,379
Cost of Goods	<u>591,758</u>
Gross Profit	88,621
Selling, General & Administrative Expenses	52,771
Non-Operating Income	7
Interest Expense	<u>397</u>
Income Before Taxes	35,460
Provision for Income Taxes	<u>10,820</u>
Net Income	<u>\$ 24,640</u>

Condensed Balance Sheet **March 27, 1988** **(000's omitted)**

Cash	\$ 2,806
Receivables	149,781
Inventories	60,654
Other Current Assets	<u>24,328</u>
Total Current Assets	237,569
Net Property, Plant and Equipment	283,906
Deferred Charges Assets	<u>3,459</u>
Total Assets	<u>\$ 524,934</u>
Accounts Payable	\$ 51,396
Accrued Liabilities	96,156
Federal and State Income Taxes	<u>13,846</u>
Total Current Liabilities	161,398
Deferred Income Taxes	49,401
Accrued Employee Benefits	<u>10,738</u>
Total Liabilities	221,537
Common Stock	43,391
Retained Earnings	261,974
Cumulative Translation Adjustment	<u>(1,968)</u>
Total Shareholders' Investment	303,397
Total Liabilities and Shareholders' Investment	<u>\$ 524,934</u>

**Briggs & Stratton Corporation
Partial Planning Memorandum**

Management

Key management personnel are college educated and exhibit a high degree of business knowledge. Most have been with the firm for at least five years. There have been no changes in key management personnel during the recent past.

EDP Department

The EDP department is considered to have very strong controls over access to data entry, master files, etc.. There have been no modifications of the EDP operations during the past year.

Internal Audit Department

The internal audit staff consists of a manager, who reports to the controller and to the audit committee of the board of directors, three seniors, and fifteen staff assistants. The internal audit function was reviewed in accordance with firm standards and it was concluded that the work of the internal audit staff could be relied on. The internal audit staff will assist us in the following areas:

- 1) Cash balances.
- 2) Accounts receivable confirmation control and follow-up under close supervision.
- 3) Inventory price testing.
- 4) Vouching of fixed asset additions and deletions.
- 5) Coordination of search for unrecorded assets.

Program and Scope

The scope of our work must be sufficient for us to render an opinion on the financial statements of Briggs & Stratton Corporation included in the client's annual report to stockholders for the fiscal year ended June 30, 1988.

Our work must be in accordance with generally accepted auditing standards.

Revenue Cycle

There has been minimal turnover in the sales, credit, shipping, billing and accounts receivable departments. Additionally, preliminary evaluations indicate that client personnel in these departments have a high degree of experience and competence.

Briggs & Stratton Corporation Partial Planning Memorandum

Accounts receivable are normally highest during the March quarter due to the cyclical nature of the client's business. Sales of engines is driven by the need for original equipment manufactures to deliver lawn and garden equipment to retail stores in the spring and early summer. This results in demand for the client's products being at its peak during the winter manufacturing season.

See Insert #1 - This information data point about Briggs & Stratton Corporation will change for each of the eight different case illustrations to come.

See Insert #2 - This information data point about Briggs & Stratton Corporation will change for each of the eight different case illustrations to come.

Sales accounting for 27% of fiscal 1987 sales were made to two major engine customers. Sales to the client's largest customer, MTD Products Inc., were 14% of fiscal 1987 sales. Sales to the second largest customer, Murray Ohio Manufacturing, were 13% of fiscal 1987 sales.

Export sales accounted for 16% of fiscal 1987 sales. These sales were principally to customers in European countries and Canada.

The credit manager approves credit to customers and also determines what accounts should be written-off suggesting a risk that not all uncollectible accounts will be written off.

Virtually all of the client's sales are on account, the infrequent exceptions being customers with poor credit history. The controller has provided a stratified accounts receivable aging summary as of March 30, 1988, as follows:

Account Balance (\$)	All Accounts		Current Accounts		Accounts 30-60 Days Overdue		Accounts Over 60 Days Overdue	
	#	\$	#	\$	#	\$	#	\$
(000's omitted)								
500 - over	22	57,677	21	56,939	1	738		
250 - 500	65	25,562	62	24,612	2	683	1	267
100 - 250	90	21,673	82	20,669	6	863	2	141
50 - 100	122	10,723	77	7,630	36	2,445	9	648
10 - 50	439	14,893	273	9,521	124	4,031	42	1,341
5 - 10	899	5,411	677	4,102	159	952	63	357
0 - 5	5,849	13,842	5,298	12,748	417	826	134	268
	7,486	149,781	6,490	136,221	745	10,538	251	3,022

Note: The following program links audit procedures to audit objectives. The program identifies audit objectives for which particular audit procedures or groups of audit procedures provide some degree of assurance. An "x" does not imply that the audit procedure alone provides a sufficient source of assurance concerning an audit objective. Normally several procedures are performed to provide a sufficient source of assurance concerning an audit objective. This information is provided as a general guide to facilitate your completion of this project. This linkage of audit procedures to audit objectives may not be applicable for all circumstances. You may disregard this information if you do not find it useful.

Page 1 of 4

**Briggs & Stratton Corporation
Revenue Cycle Audit Program**

Program Step	Exist- ence	Comp- leteness	Objectives		
			Cutoff	Valua- tion	Disclos- ure*
CONTROL TEST PROCEDURES:					
1) Familiarize yourself with the client's revenue cycle procedures by reviewing the flowcharts and narrative description of procedures.	x	x	x	x	x
2) Observe whether monthly statements are mailed to customers and inquire about whose responsibility it is.	x			x	
3) Observe whether a restrictive endorsement is used on cash receipts.		x			
4) Observe whether personnel responsible for handling cash have no accounting responsibilities and inquire as to their duties.	x	x			
COMBINED TESTS OF CONTROLS AND TRANSACTIONS:					
5) Account for numerical sequence of packing slips.	x	x		x	x
a) Review unissued packing slips for numerical sequence.					
b) Review Issued packing slips for numerical sequence.					
c) Randomly select <u>100</u> packing slips from the numerical packing slip file and					
- Examine numerical packing slip file for supporting documents, which includes a packing slip and sales order.					
- Examine sales order for indication of internal verification of credit approval.					
- Trace to a sales invoice and the sales journal. (Substantive test of transactions.)					

* - and Classification

**Briggs & Stratton Corporation
Revenue Cycle Audit Program**

Program Step	Exist- ence	Comp- leteness	Objectives		
			Cutoff	Valua- tion	Disclos- ure*
5) c) - Compare types and quantities of goods shipped with types and quantities billed to customer.					
6) Account for numerical sequence of sales invoices.	x	x		x	x
a) Review unissued sales invoices for numerical sequence.					
b) Review issued sales invoices for numerical sequence.					
c) Randomly select <u>75</u> sales invoices from the numerical invoice file and					
- Examine numerical sales invoice file for supporting documents, which includes a sales invoice, packing slip and sales order.					
- Examine invoice for indication of internal verification of extensions and prices.					
- Compare billing price on the invoices to selling prices in effect at the invoice date.					
- Test extensions and footing totals.					
- Trace totals to the accounts receivables records and sales journal.					
(Substantive test of transactions.)					
SUBSTANTIVE TESTS OF TRANSACTIONS:					
7) Randomly select <u>50</u> sales invoices from the sales journal and trace totals to numerical invoice file of supporting documents, which includes a sales invoice, packing slip and sales order.	x			x	x
8) Randomly select <u>25</u> cash receipts from the cash prelisting and trace to the cash receipts journal and subsidiary accounts receivable ledger. Test for name, date and amount.	x	x			x
9) Randomly select <u>25</u> credits from the subsidiary accounts receivable ledger and trace to the cash receipts journal and cash prelisting. Test for name, date and amount.	x				x

**Briggs & Stratton Corporation
Revenue Cycle Audit Program**

Program Step	Exist- ence	Comp- leteness	Objectives Cutoff	Valua- tion	Disclos- ure*
ANALYTICAL REVIEW PROCEDURES:					
10) Compare the accounts receivable and allowance for doubtful accounts ending balances to prior years.	x	x	x	x	x
11) Compare bad debt expense as a percentage of net sales to prior years.				x	
12) Compare current year write-offs to prior year write-offs and allowance for doubtful accounts.	x	x		x	
13) See Insert #3 - This audit procedure will change for each of the eight different case illustrations to come.	x	x	x	x	
SUBSTANTIVE TESTS OF DETAILS:					
14) Foot and crossfoot the journals and ledgers, trace the totals to the general ledger.	x	x	x	x	x
15) Review the journals and ledgers for unusual transactions and amounts.	x				x
16) Review receivables for amounts due from related parties, credit balances and unusual items.	x				x
17) Confirm accounts receivable as of <u>6/30/88</u> . a) Positively confirm <u>15</u> largest account balances as of the confirmation date. b) Positively confirm <u>50</u> randomly selected account balances as of the confirmation date.	x		x	x	
18) Perform alternative procedures for positive confirmation nonresponses.	x		x	x	
19) Obtain an analysis of the allowance for doubtful accounts and bad debt expense. a) Test accuracy of schedules. b) Examine authorization for write-offs and trace to the general ledger.	x	x		x	

**Briggs & Stratton Corporation
Revenue Cycle Audit Program**

Program Step	Exist- ence	Comp- leteness	Objectives		Disclos- ure*
			Cutoff	Valua- tion	
20) See Insert #4 - This audit procedure will change for each of the eight different case illustrations to come.	x			x	
21) Select the last <u>30</u> packing slips issued before year-end and the first <u>30</u> packing slips issued after year-end from the numerical packing slip file. Trace to numerical invoice file and sales journal noting proper cutoff.	x	x	x	x	
22) Select the last <u>15</u> cash receipts received before year-end and the first <u>15</u> cash receipts received after year-end from the chronological deposit slip file. Trace to cash prelisting and cash receipts journal noting proper cutoff.	x	x	x	x	
23) Select the last <u>15</u> credit memos issued before year-end and the first <u>15</u> credit memos issued after year-end from the numerical credit memo file. Trace to subsidiary accounts receivable ledger noting proper cutoff.	x	x	x	x	

Risk Definitions

Expectations of Errors is defined as the risk that a material misstatement 1) could occur in an account balance (inherent risk) and 2) not be prevented or detected on a timely basis by the entity's internal control structure (control risk).

Analytical Review Risk is defined as the risk that the auditor's analytical review procedures would not detect a material misstatement that could exist in an account balance. Analytical review risk is reduced by performing analytical review procedures.

Tests of Details Risk is defined as the risk that the auditor's substantive tests of details and transactions would not detect a material misstatement that could exist in an account balance. Tests of details risk is reduced by performing substantive tests of details and transactions.

Audit Risk is defined as the risk that a material misstatement that could exist in an account balance would remain undetected after the auditor has completed all audit procedures deemed necessary.

Case 1**Insert #1**

Another factor contributing to the higher receivable balance is the loosening of the client's credit policies. During the current year the client adopted a policy of attempting to accommodate young, developing companies in order to increase market share. One vehicle for this strategy was the loosening of the client's credit policies. This suggests an increase in the risk of future write-offs.

Insert #2

The client has a very solid base of reputable customers. However, increases in foreign competition, mainly from Asian countries, has caused a significant increase in the number of business failures within the industries of the client's customers. This suggests an increase in the risk of future write-offs.

Insert #3

13) Nothing.

Insert #4

20) Investigate collectibility of account balances. Select all accounts with balances that are 90 days or more past due. Discuss the collectibility of these accounts with the credit manager.

Case 1 - Risk Assessments

Note: This study is concerned with your risk assessments related to accounts receivable. You should disregard all issues related to other account balances.

Expectations of Errors - Please indicate in the space provided your assessment of expectations of errors related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Analytical Review risk - Please indicate in the space provided your assessment of the combined effectiveness of the analytical review procedures towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Tests of Details Risk - Please indicate in the space provided your assessment of the combined effectiveness of the substantive tests of details and transactions towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Audit Risk - Please indicate in the space provided your assessment of audit risk related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Case 2**Insert #1**

Another factor contributing to the higher receivable balance is the loosening of the client's credit policies. During the current year the client adopted a policy of attempting to accommodate young, developing companies in order to increase market share. One vehicle for this strategy was the loosening of the client's credit policies. This suggests an increase in the risk of future write-offs.

Insert #2

The client has a very solid base of reputable customers. However, increases in foreign competition, mainly from Asian countries, has caused a significant increase in the number of business failures within the industries of the client's customers. This suggests an increase in the risk of future write-offs.

Insert #3

13) Nothing.

Insert #4

20) Investigate collectibility of account balances. Select all accounts with balances that are 30 days or more past due. Review these accounts for subsequent payment or other evidence of collectibility.

Case 2 - Risk Assessments

Note: This study is concerned with your risk assessments related to accounts receivable. You should disregard all issues related to other account balances.

Expectations of Errors - Please indicate in the space provided your assessment of expectations of errors related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Analytical Review risk - Please indicate in the space provided your assessment of the combined effectiveness of the analytical review procedures towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Tests of Details Risk - Please indicate in the space provided your assessment of the combined effectiveness of the substantive tests of details and transactions towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Audit Risk - Please indicate in the space provided your assessment of audit risk related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Case 3**Insert #1**

Another factor contributing to the higher receivable balance is the loosening of the client's credit policies. During the current year the client adopted a policy of attempting to accommodate young, developing companies in order to increase market share. One vehicle for this strategy was the loosening of the client's credit policies. This suggests an increase in the risk of future write-offs.

Insert #2

The client has a very solid base of reputable customers. However, increases in foreign competition, mainly from Asian countries, has caused a significant increase in the number of business failures within the industries of the client's customers. This suggests an increase in the risk of future write-offs.

Insert #3

- 13) Obtain an aged listing of accounts receivables.
- a) Randomly select 25 accounts and trace to the subsidiary records.
 - b) Test footings and trace to the general ledger.
 - c) Compare aging of accounts receivable to prior years.
 - d) Compare average collection period of accounts receivable to prior years.

Insert #4

- 20) Investigate collectibility of account balances. Select all accounts with balances that are 90 days or more past due. Discuss the collectibility of these accounts with the credit manager.

Case 3 - Risk Assessments

Note: This study is concerned with your risk assessments related to accounts receivable. You should disregard all issues related to other account balances.

Expectations of Errors - Please indicate in the space provided your assessment of expectations of errors related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Analytical Review risk - Please indicate in the space provided your assessment of the combined effectiveness of the analytical review procedures towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Tests of Details Risk - Please indicate in the space provided your assessment of the combined effectiveness of the substantive tests of details and transactions towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Audit Risk - Please indicate in the space provided your assessment of audit risk related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Case 4**Insert #1**

Another factor contributing to the higher receivable balance is the loosening of the client's credit policies. During the current year the client adopted a policy of attempting to accommodate young, developing companies in order to increase market share. One vehicle for this strategy was the loosening of the client's credit policies. This suggests an increase in the risk of future write-offs.

Insert #2

The client has a very solid base of reputable customers. However, increases in foreign competition, mainly from Asian countries, has caused a significant increase in the number of business failures within the industries of the client's customers. This suggests an increase in the risk of future write-offs.

Insert #3

- 13) Obtain an aged listing of accounts receivables.
- a) Randomly select 25 accounts and trace to the subsidiary records.
 - b) Test footings and trace to the general ledger.
 - c) Compare aging of accounts receivable to prior years.
 - d) Compare average collection period of accounts receivable to prior years.

Insert #4

- 20) Investigate collectibility of account balances. Select all accounts with balances that are 30 days or more past due. Review these accounts for subsequent payment or other evidence of collectibility.

Case 5**Insert #1**

Another factor contributing to the higher receivable balance is the decline of the U.S. dollar relative to the Japanese yen enabling the client to pick-up market share from its Japanese competitors.

Insert #2

The client has a very solid base of reputable customers. The client's customers can be best characterized as reasonably stable. Few of these customers have shown signs of financial difficulty.

Insert #3

- 13) Obtain an aged listing of accounts receivables.
- a) Randomly select 25 accounts and trace to the subsidiary records.
 - b) Test footings and trace to the general ledger.
 - c) Compare aging of accounts receivable to prior years.
 - d) Compare average collection period of accounts receivable to prior years.

Insert #4

- 20) Investigate collectibility of account balances. Select all accounts with balances that are 30 days or more past due. Review these accounts for subsequent payment or other evidence of collectibility.

Case 5 - Risk Assessments

Note: This study is concerned with your risk assessments related to accounts receivable. You should disregard all issues related to other account balances.

Expectations of Errors - Please indicate in the space provided your assessment of expectations of errors related to accounts receivable.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Low								High

Analytical Review risk - Please indicate in the space provided your assessment of the combined effectiveness of the analytical review procedures towards assessing the fair presentation of accounts receivable.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Not Effective								Very Effective

Tests of Details Risk - Please indicate in the space provided your assessment of the combined effectiveness of the substantive tests of details and transactions towards assessing the fair presentation of accounts receivable.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Not Effective								Very Effective

Audit Risk - Please indicate in the space provided your assessment of audit risk related to accounts receivable.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Low								High

Case 6**Insert #1**

Another factor contributing to the higher receivable balance is the decline of the U.S. dollar relative to the Japanese yen enabling the client to pick-up market share from its Japanese competitors.

Insert #2

The client has a very solid base of reputable customers. The client's customers can be best characterized as reasonably stable. Few of these customers have shown signs of financial difficulty.

Insert #3

- 13) Obtain an aged listing of accounts receivables.
- a) Randomly select 25 accounts and trace to the subsidiary records.
 - b) Test footings and trace to the general ledger.
 - c) Compare aging of accounts receivable to prior years.
 - d) Compare average collection period of accounts receivable to prior years.

Insert #4

- 20) Investigate collectibility of account balances. Select all accounts with balances that are 90 days or more past due. Discuss the collectibility of these accounts with the credit manager.

Case 6 - Risk Assessments

Note: This study is concerned with your risk assessments related to accounts receivable. You should disregard all issues related to other account balances.

Expectations of Errors - Please indicate in the space provided your assessment of expectations of errors related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Analytical Review risk - Please indicate in the space provided your assessment of the combined effectiveness of the analytical review procedures towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Tests of Details Risk - Please indicate in the space provided your assessment of the combined effectiveness of the substantive tests of details and transactions towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Audit Risk - Please indicate in the space provided your assessment of audit risk related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Case 7**Insert #1**

Another factor contributing to the higher receivable balance is the decline of the U.S. dollar relative to the Japanese yen enabling the client to pick-up market share from its Japanese competitors.

Insert #2

The client has a very solid base of reputable customers. The client's customers can be best characterized as reasonably stable. Few of these customers have shown signs of financial difficulty.

Insert #3

13) Nothing.

Insert #4

20) Investigate collectibility of account balances. Select all accounts with balances that are 30 days or more past due. Review these accounts for subsequent payment or other evidence of collectibility.

Case 7 - Risk Assessments

Note: This study is concerned with your risk assessments related to accounts receivable. You should disregard all issues related to other account balances.

Expectations of Errors - Please indicate in the space provided your assessment of expectations of errors related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Analytical Review risk - Please indicate in the space provided your assessment of the combined effectiveness of the analytical review procedures towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Tests of Details Risk - Please indicate in the space provided your assessment of the combined effectiveness of the substantive tests of details and transactions towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Audit Risk - Please indicate in the space provided your assessment of audit risk related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Case 8**Insert #1**

Another factor contributing to the higher receivable balance is the decline of the U.S. dollar relative to the Japanese yen enabling the client to pick-up market share from its Japanese competitors.

Insert #2

The client has a very solid base of reputable customers. The client's customers can be best characterized as reasonably stable. Few of these customers have shown signs of financial difficulty.

Insert #3

13) Nothing.

Insert #4

20) Investigate collectibility of account balances. Select all accounts with balances that are 90 days or more past due. Discuss the collectibility of these accounts with the credit manager.

Case 8 - Risk Assessments

Note: This study is concerned with your risk assessments related to accounts receivable. You should disregard all issues related to other account balances.

Expectations of Errors - Please indicate in the space provided your assessment of expectations of errors related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Analytical Review risk - Please indicate in the space provided your assessment of the combined effectiveness of the analytical review procedures towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Tests of Details Risk - Please indicate in the space provided your assessment of the combined effectiveness of the substantive tests of details and transactions towards assessing the fair presentation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Audit Risk - Please indicate in the space provided your assessment of audit risk related to accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

SECTION THREE

REQUEST FOR DEMOGRAPHIC INFORMATION

1) Location of Employment:

City _____, State _____

2) Firm of Employment? _____

3) Your age? _____

4) Experience (round to the nearest year):

- a) Number of years of business experience _____
 b) Number of years of auditing experience _____
 c) Number of years of public accounting experience _____
 d) Number of years of Big Eight accounting experience _____

5) Circle any of the following certificates you have earned:

CPA CIA CMA

Other(s) _____

6) What was your undergraduate major? _____

7) Do you have a graduate degree? Yes _____ No _____

If yes, circle the graduate degrees which you have received?

- MBA with accounting concentration
 MBA with concentration in nonaccounting area
 MS in accounting
 Other(s) _____

8) Circle the job title that most accurately describes your position:

Partner/Principal Manager Supervisor Senior Staff

Other _____

9) How many years have you been at your present job title? . _____

10) Please classify your audit client experience into the following categories:

Non-Manufacturing companies	_____ %
Manufacturing companies having less than \$100 million	
in sales	_____ %
Manufacturing companies having between \$100-500 million	
in sales	_____ %
Manufacturing companies having over \$500 million in sales	_____ %
	100%

REQUEST FOR DEMOGRAPHIC INFORMATION - CONTINUED

- 11) What portion of your audit time is spent on clients where the audit approach could be characterized as a control reliance approach?

Control reliance approach	_____	%
Not a control reliance approach	_____	%
		100%

- 12) Compared with other auditors how would you view your willingness to accept risk?

Much more willing	_____
More willing	_____
As willing as most	_____
Less willing	_____
Much less willing	_____

- 13) How representative of actual audit engagements did you find this project?

Very representative	_____
Representative	_____
Unrepresentative	_____
Very unrepresentative	_____

- 14) How interesting did you find your participation in this phase of the project?

Very interesting	_____
Reasonably interesting	_____
Of little interest	_____
Of no interest	_____

- 15) How interesting did you find your participation in the overall project?

Very interesting	_____
Reasonably interesting	_____
Of little interest	_____
Of no interest	_____

- 16) In total, how long did it take you to complete this phase of the project? _____

REQUEST FOR DEMOGRAPHIC INFORMATION - CONTINUED

17) Would you like a copy of the results of this study? Yes ____, No ____

If you answered yes, please provide the following information or attach a business card.

Name _____
Company _____
Address _____

This completes your participation in this study. After checking to see that you have not inadvertently failed to complete any part of the study, please return the booklet in the enclosed envelope. Once again, thank you for your participation in this study.

Inserts for Objective Level Instrument

Risk Definitions

Expectations of Errors is defined as the risk that a material misstatement 1) could occur in an objective (inherent risk) and 2) not be prevented or detected on a timely basis by the entity's internal control structure (control risk).

Analytical Review Risk is defined as the risk that the auditor's analytical review procedures would not detect a material misstatement that could exist in an objective. Analytical review risk is reduced by performing analytical review procedures.

Tests of Details Risk is defined as the risk that the auditor's substantive tests of details and transactions would not detect a material misstatement that could exist in an objective. Tests of details risk is reduced by performing substantive tests of details and transactions.

Audit Risk is defined as the risk that a material misstatement that could exist in an objective would remain undetected after the auditor has completed all audit procedures deemed necessary.

Risk Assessments

Note: This study is concerned with your risk assessments related to the valuation of accounts receivable (e.g. accounts receivable is recorded at an appropriate carrying value). You should disregard all issues related to other objectives (i.e. completeness, existence, disclosure, etc.).

Expectation of Errors - Please indicate in the space provided your assessment of expectations of errors related to the valuation of accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

Analytical Review Risk - Please indicate in the space provided your assessment of the combined effectiveness of the analytical review procedures towards assessing the correct valuation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Tests of Details Risk - Please indicate in the space provided your assessment of the combined effectiveness of the substantive tests of details and transactions towards assessing the correct valuation of accounts receivable.

1	2	3	4	5	6	7	8	9
Not Effective								Very Effective

Audit Risk - Please indicate in the space provided your assessment of audit risk related to the valuation of accounts receivable.

1	2	3	4	5	6	7	8	9
Low								High

LIST OF REFERENCES

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- American Institute of Certified Public Accountants, Statement on Auditing Standards No. 1 (AICPA, 1973).
- , Statement on Auditing Standards No. 31: Evidential Matter Materiality in Conducting an Audit (AICPA, 1980).
- , Statement on Auditing Standards No. 39: Audit Sampling (AICPA, 1981).
- , Statement on Auditing Standards No. 47: Audit Risk and Materiality in Conducting an Audit (AICPA, 1983).
- , Statement on Auditing Standards No. 55: Consideration of the Internal Control Structure in a Financial Statement Audit (AICPA, 1988).
- Arens, A. A., and J. K. Loebbecke, Auditing: An Integrated Approach, (Prentice Hall, 1988).
- Ashton, R. H., "An Experimental Study of Internal Control Judgments," Journal of Accounting Research (Spring 1974), pp. 143-157.
- , Human Information Processing in Accounting (American Accounting Association, 1982).
- , Research in Audit Decision Making: Rational, Evidence, and Implications, Research Monograph Number 6 (The Canadian Certified General Accounts' Research Foundation, 1983).
- , and P. R. Brown, "Descriptive Modeling of Auditors' Internal Control Judgments: Replications and Extensions," Journal of Accounting Research (Spring 1980), pp. 269-277.
- Biggs, S. F. and J. J. Wild, "An Investigation of Auditor Judgment in Analytical Review," The Accounting Review (October 1985), pp. 607-633.
- Bonner, S., "Experience Effects and Cue Choice in Analytical Risk Assessment," Working Paper (University of Colorado, 1988).
- Brewer, C. W., "The Nature of Audit Risk Indicators and their Effect on the Intensity of Audit Work Performed," PH.D. Dissertation (University of Houston, 1981).

- Buckless F. A. and S. M. Ravenscroft, "Contrast Coding: A Refinement of ANOVA in Behavioral Analysis," Working Paper (Michigan State University, 1988).
- Canadian Institute of Chartered Accountants, Extent of Audit Testing: A Research Study, (CICA, 1980).
- Cushing, B. E., and J. K. Loebbecke, "Analytical Approaches to Audit Risk: A Survey and Analysis," Auditing: A Journal of Practice and Theory (Fall, 1983), pp. 23-41.
- Daniel, S. J., "Some Empirical Evidence About the Assessment of Audit Risk in Practice," Auditing: A Journal of Practice and Theory (Spring 1988), pp. 174-181.
- Duke, G. L., R. A. Leitch and J. Neter, Behavior of Test Statistics in the Auditing Environment: An Empirical Study, Studies in Accounting Research No. 23 (American Accounting Association, 1985).
- Einhorn, H. J., "Expert Judgment: Some Necessary Conditions and an Example," Journal of Applied Psychology (1974).
- , and R. Hogarth, "Behavioral Decision Theory, Processes of Judgment and Choice," Annual Review of Psychology (1981).
- Felix, W. L., and W. R. Kinney, Jr., "Research in the Auditor's Opinion Formulation Process: State of the Art," The Accounting Review (April 1982), pp. 245-271.
- Ghiselli E. E., J. P. Campbell and S. Zedeck, Measurement Theory for the Behavioral Sciences, (W. H. Freeman and Company, 1981).
- Gibbons, M., and F. M. Wolf, "Auditors' Subjective Decision Environment: The Case of a Normal External Audit," The Accounting Review (January 1982), pp. 105-124.
- Hair, J. F., R. E. Anderson, R. L. Tatham, and B. J. Grabrowsky, Multivariate Data Analysis (Macmillan Publishing Co., 1984).
- Hamilton, R. E. and W. F. Wright, "Internal Control Judgments and Effects of Experience: Replications and Extensions," Journal of Accounting Research (Autumn 1982), pp. 756-765.
- Haskins, M. E., "Client Control Environments: An Examination of Auditors' Perceptions," The Accounting Review (July 1987), pp. 542-563.
- Hylas, R. and R. Ashton, "Audit Detection of Financial Statement Errors," The Accounting Review (October 1982), pp. 751-777.

- Jiambalvo, J., and W. Waller, "Decomposition and Assessments of Audit Risk," Auditing: A Journal of Practice & Theory (Spring 1984), pp. 80-88.
- Joyce, E. J., "Expert Judgment on Audit Program Planning," Journal of Accounting Research (Supplement 1976), pp. 29-60.
- Kahneman, D., P. Slovic, and A. Tversky, Judgment Under Uncertainty: Heuristics and Biases (Cambridge University Press, 1982).
- Kaplan, S., "An Examination of the effects of Environment and Explicit Internal Control on Planned Audit Hours," Auditing: A Journal of Practice & Theory (Fall 1985), pp. 12-25.
- , and P. Reckers, "An Empirical Examination of Auditor's Initial Planning Processes," Auditing: A Journal of Practice & Theory (Fall 1984), pp. 1-19.
- Keppel, G., Design and Analysis a Researcher's Handbook (Prentice-Hall, Inc., 1982).
- Kinney, W., "A Note on Compounding Probabilities in Auditing," Auditing: A Journal of Practice and Theory (Spring 1983), pp. 13-22.
- , "Achieved Audit Risk and the Audit Outcome Space," Working Paper (University of Texas, 1988).
- , and W. C. Uecker, "Mitigating the Consequences of Anchoring in Audit Judgments," The Accounting Review (January 1982), pp. 55-69.
- Kreutzfeldt, R. and W. Wallace, "Error Characteristics in Audit Populations: Their Profile and Relationship to Environmental Factors," Auditing: A Journal of Practice and Theory (Fall 1986), pp. 20-43.
- Libby, R., Accounting and Human Information Processing: Theory and Applications (Prentice-Hall, 1981).
- , J. Artman, and J. Willingham, "Process Susceptibility, Control Risk, and Audit Planning," The Accounting Review (April 1985), pp. 212-230.
- Messier, Jr., W., and D. Emery, "Some Cautionary Notes on the Use of Conjoint Measurement for Human Judgment Modeling," Decision Sciences (October 1980), pp. 678-690.
- Moriarity, S., and F. H. Barron, "Modeling the Materiality Judgments of Audit Partners," Journal of Accounting Research (Autumn 1976), pp. 320-341.

- Pindyck, R. S. and D. L. Rubinfeld, *Econometric Models and Economic Forecasts*, (McGraw-Hill, 1981)
- Reckers, P. M. and M. E. Taylor, "Consistency in Auditors' Evaluations of Internal Accounting Controls," Journal of Accounting, Auditing and Finance (fall 1979), pp.42-55.
- Riley, A. C., "An Analytical Framework for the Evaluation of Inherent Audit Risk," D.B.A. Dissertation (The George Washington University, 1987).
- Siegel, S., *Nonparametric Statistics*, (McGraw-Hill, 1956).
- Slovic, P., B. Fischhoff, and S. Lichtenstein, "Behavioral Decision Theory," Annual Review of Psychology (1977), pp. 1-39.
- Strawser, J. R., "An Empirical Investigation of Auditor Judgment: Factors Affecting Perceived Audit Risk," PH.D. Dissertation (Texas A&M University, 1985).
- Sullivan, J. D., "Why the Auditing Standards on Evaluating Internal Control Needed to be Replaced," University of Kansas Auditing Symposium VIII (University of Kansas, 1988).
- Tatsuoka, M. M., *Multivariate Analysis: Techniques for Educational and Pshychological Research*, (John Wiley and Sons, 1971).
- Warren, C., "Confirmation Reliability - The Evidence," Journal of Accountancy (February 1975), pp. 85-89.

