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DESCRIBING THE DEMAND FOR INTERNAL AUDIT SERVICES IN U. S. COLLEGES AND UNIVERSITIES

By

Donna Jane Reed

A Dissertation
Submitted to the Faculty of
Mississippi State University
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DESCRIBING THE DEMAND FOR INTERNAL AUDIT SERVICES IN U.S. COLLEGES AND UNIVERSITIES

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The internal audit profession has experienced significant growth in size, status and recognition over the last 50 years. From 1975 to 1990, the number of members of the Institute of Internal Auditors has grown from 11,000 to 47,000. College and university internal audit functions have also grown significantly. Since the inception of the Association of College and University Auditors in 1958, membership has increased from thirteen to more than 500 member institutions. Although an extensive amount of empirical research has examined the demand for external audit services, no empirical studies have examined the demand for the internal audit function.

In the current study, a model is developed that describes the demand for internal audit in colleges and universities, with internal audit staff size the proxy for demand. Characteristics affecting the demand for internal audits are measured with ten variables grouped into three categories. The categories include organizational char-

acteristics of size and complexity; accountability issues related to federal support of research and student aid, medical education programs, NCAA membership and being a public institution; auditor effectiveness related to internal auditor objectivity, competence and performance.

A principal component analysis reduces the ten variables to five components. The first component, wealth, comprises variables measuring NCAA membership and complexity of the institution. The second component, federal regulated, contains variables for federally supported research and student aid programs and for medical education programs. The third component, size, includes variables measuring size and designation as a public or private institution. The fourth component, authority, includes variables for objectivity of internal audit and percent of audit recommendations implemented by administration. The audit staffs' years of service and percent of audit staff with professional certifications create the fifth component, competence. In a principal component regression, the wealth, federal regulated, size, and authority components are significant determinants of the demand for internal audit services in colleges and universities.

DEDICATION

For Jimmy, who started me on this journey and stayed with me all the way.

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CHAPTER I

INTRODUCTION

The internal audit profession has experienced significant growth in size, status and recognition over the last 50 years. From 1975 to 1990, the number of members of the Institute of Internal Auditors (IIA) grew from 11,000 to 47,000, and the number of Certified Internal Auditors (CIAs) grew from approximately 8,000 to 17,000 (Reinstein 1994). Numerous factors have contributed to this growth, including the passage of the Foreign Corrupt Practices Act, the Treadway Commission's reports, growing corporate concerns over financial controls, management fears of fraud, and increased need for organization efficiency (Lampe and Sutton 1997).

The internal audit function has also grown significantly in colleges and universities. Since the inception of the Association of College and University Auditors (ACUA) in 1958 membership has increased from 13 (Dumm 1971) to more than 500 member institutions (ACUA 1996). The growth of internal audit in colleges and universities may be attributed to growing concerns over financial controls, management fears of fraud, and an increased need for organization efficiency (Manahan 1976). Another factor that may have promoted internal audit in higher education is the Institute of Internal Auditor's (IIA's) position statement (1991) entitled *The Audit Committee in the Public Sector* (Montondon 1995). This statement represents the IIA's recommen-

dation that municipalities and all other public-sector entities have a standing audit committee and an internal auditor.

Standards for the Professional Practice of Internal Auditing (SPPIA) state that one of the responsibilities of internal audit directors is to ensure adequate audit coverage of the organization (IIA 1991). However, little is known about the factors that influence how organizations allocate resources to provide that coverage. Organizational size is assumed to be an important determinant of internal audit staff size (Flesher 1996). Yet, surveys have demonstrated that organization size alone does not explain the demand for internal audit in an organization. One study (Reece 1974) found that college and university internal audit staff sizes varied from one to fifteen internal auditors. However, 35 percent of the largest responding organizations had only one or two internal auditors. Spruill (1989) notes that small universities generally do not have internal audit staffs. However, there is significant variation in the size of the internal audit staff at large universities (greater than 20,000 students) as demonstrated by the data used in the current study. For example, three universities that are comparable in terms of number of academic programs, dollar volume of federal research, current fund expenditures and number of students have internal audit staffs that vary from eight to seventeen.

Statement of the Problem

Spruill (1992) notes that college and university administrators are caught between two opposing demands. On the one hand, there is a need for a high level of accountability for the resources entrusted to the institution. Government agencies, do-

nors, students, and faculty want assurance that funds are spent wisely, equitably, and legally. Audits serve that end. On the other hand, institutional administrators are called on to reduce overhead, and audit is an overhead expense. Results of a recent survey found that internal auditors are generally satisfied with the adequacy of physical resources and the competency of their staff but are experiencing dissatisfaction with their staff size (Montondon and Meixner 1993). In another study, audit committee members indicated that they should assess the size of the internal audit function (Rezaee 1997). However, governing boards and management must attempt to determine sufficient staff size of an internal audit function without a descriptive model to facilitate the process.

Generally, when administrative functions are insufficiently staffed, management becomes aware of the inadequacy through customer or employee complaints. However, that might not be the case with the internal audit function. According to Sawyer (1988), auditees resent audits and internal auditors; therefore, they might not complain about lack of audit coverage from internal auditors in the same way that they would complain about lack of services from other administrative functions. Management would need some other mechanism to judge the adequacy of audit coverage.

An extensive amount of empirical research examines the demand for external audit services. Studies identify a number of variables that predict the amount of external audit services demanded by the private sector (Simunic 1980; Palmrose 1986) and the governmental sector (Rubin 1988; Berry and Wallace 1986). Although extensive research has been conducted on external audit services, only a few empirical studies of

the internal audit function have been conducted (Spruill 1989; Bethea 1992; Traver 1991), and none of these examine the demand for the internal audit function.

Purpose of the Study

The purpose of this study is to develop and test a descriptive model of the demand for internal audit, using cross-sectional data from United States' colleges and universities for fiscal year 1996. Williamson's (1971) control loss theory has been used in previous audit research to explain why privately held companies demand audit services (Abdel-Khalik 1993). Spraakman and Ibrahim (1998) used Williamson's control loss theory to test the usefulness of both operational audit findings and financial audit findings for cost economizing. Penno (1990), relying on Williamson's control loss theory, found the internal audit function produced near first-best solutions in a principal agent model using a small fraction of available information. Williamson's control loss theory is used in developing the descriptive model for the demand for internal audit.

The model developed for this study examines how the demand for internal audit in higher education is impacted by the size and complexity of each organization, accountability issues faced by each organization, and the effectiveness of each organization's internal audit function. In this model, the number of professional auditors in each organization provides a proxy for the demand for internal audit. The number of full-time equivalent students provides a proxy for organizational size. The Carnegie Classification, which ranks the complexity of higher education institutions based on several factors, provides a proxy for organizational complexity.

Higher education institutions are dependent on numerous groups outside the organization for support and are accountable to those organizations. Accountability issues facing colleges and universities identified as being significant are expected to impact internal audit demand and are included in the model. The accountability issues tested are (1) government oversight of institutions receiving federal funds for student aid and research; (2) National Collegiate Athletic Association (NCAA) oversight of member institution's athletic programs; (3) Federal government oversight of medical education programs and (4) the additional public and legislative oversight of public institutions.

The effectiveness of the internal audit function may affect management's demand for internal audit services. This study relies on the criteria used by external auditors (Statement on Auditing Standard No. 65) to evaluate internal auditors, which include the objectivity, competence and work performance of the internal audit function. Objectivity measurements are based on the level in the organization to which the internal audit function reports. Competence measurements are based on average number years of experience of the internal audit staff. Finally, work performance is measured by the percent of internal audit recommendations implemented by management.

The model is tested using a cross-sectional ordinary least square (OLS) regression model. The variables developed in the model are measured using data obtained from a survey by the Association of College and University Auditors (ACUA). ACUA surveyed its membership to quantify and assess the attributes and operating character-

istics of audit functions in colleges and universities. The survey instrument was mailed to approximately 500 ACUA members and a total of 300 completed surveys were received, representing a 60 percent response rate. Additional data is obtained from the National Council on Education Statistics' Integrated Postsecondary Education Data System (IPEDS), the Carnegie Foundation's Classification data and the National Athletic Association Membership Directory.

Three of the independent variables in the study are categorical variables. They are the variables measuring complexity, objectivity, and NCAA membership. Three fixed effects models are estimated using dummy variables for each category level of complexity, objectivity and NCAA membership. These fixed effects models relax the assumptions of linear relationships between the dependent and independent variables, and the specified rank assumption used in the OLS estimation.

Principal component analysis is also performed to overcome the problems caused by multicollinearity. Principal component analysis transforms a set of correlated response variables into a new set of uncorrelated variables called principal components. The principal components results were used as predictor variables in a regression model.

Relevance of the Study

Developing a model to predict the demand for internal audit services in an organization is relevant for the internal audit profession for several reasons. First, internal audit directors could benefit from a descriptive model of internal audit demand when assessing their audit resource requirements and making resource allocation deci-

sions. Second, administrators, audit committees, and governing boards might use the model as a decision-making tool when implementing and/or staffing or outsourcing an internal audit function. Third, a model that is useful in predicting internal audit demand in higher education might be modified to predict internal audit demand in other industries.

Organization of the Study

The remainder of this paper consists of the following sections. Chapter Two includes a discussion of what control does for the management of an organization and how the internal audit function helps management avoid loss of control. Chapter Three discusses the model used to describe demand for internal audit in higher education organizations and the constructs that were posited to impact the demand for internal audit in higher education. Chapter Three also includes the development of the hypotheses to be tested in the study. Chapter Four summarizes the methodology used to conduct this research and presents a discussion of the data analysis and results. Chapter Five summarizes the research findings of the current study, the limitations of the study and recommendations for further research.

CHAPTER II

LITERATURE REVIEW AND THEORY DEVELOPMENT

This chapter summarizes the theory and literature related to this study. This chapter is presented in six sections. Section one defines internal controls. Section two describes the need for internal control. Section three outlines the control loss phenomena. Reducing control loss is discussed in section four. Section five considers internal audits as a means of reducing control loss. Control loss in higher education institutions is discussed in section six.

Internal Control

The Committee of Sponsoring Organizations (COSO) of the Treadway Commission report (1992, 1) defines internal control as "a process, effected by an entity's board of directors, management and other personnel, designed to provide reasonable assurance regarding the achievement of objectives in the following categories: efficiency and effectiveness of operations; reliability of financial reporting; compliance with applicable laws and regulations." Strong internal control is a prerequisite for the success of any entity and the effectiveness of its management (Rezaee 1994). The work of internal auditing is the primary process to ensure the effectiveness of internal controls (Pushkin and Morris 1996). The governing board and management responsible for establishing and maintaining strong internal controls look to and rely on internal

auditors to provide reasonable assurance regarding the adequacy and effectiveness of the entity's internal control in achieving its goals (Rezaee 1995). Therefore, understanding the nature of internal control is essential to understanding the demand for internal audit.

Need for Internal Control

All viable, complex organizations contain control systems of some type (Lawler 1976). As Tannebaum (1968, 3) points out, "organization is impossible without some form of control." Small, poorly differentiated organizations typically do not have extensive formalized control systems. However, large organizations, where specialization of function exists, typically contain a number of formal well-developed control systems. Lawler (1976) asserts that these are the organizations with the greatest need for control systems because they have the most severe coordination and information processing problems.

In hierarchical organizations, policies and objectives are typically set or at least ratified by occupants of higher level positions and are then communicated to lower participants who are charged with the responsibility to carry out the necessary actions. According to Ouchi (1978, 173), "It is up to the higher level managers to determine whether or not the objectives have been met and, if not, to take appropriate steps--this is the process of control."

Fayol (1949, 42) says "that control consists of verifying that everything occurs in conformity with the plan adopted, the instructions issued, and the principles established. It has as its object the pointing out of weakness and errors in order to rectify

them and prevent recurrence. It operates on everything (things, people, and action)." Control is essential, whenever management assigns a duty to a subordinate. Management must also set standards by which results can be checked and take action to correct deviations as they occur. According to Wasson (1978), the mere establishment of objectives, goals and policies is not a substitute for control. The establishment of goals, objectives, and policies generates the need for control and establishes the basis for measurement.

Control Loss

An aspect of bureaucratic theory that is particularly relevant for the study of management control and internal audit is the "control loss" phenomenon. The "control loss" phenomenon was first regarded as having theoretical significance when Tullock (1965) argued that control loss in a large government bureau was predictable and could be expressed as a function of size. Downs (1967, 109) elaborated on Tullock's argument and summarized it in his "law of diminishing control:" "The larger any organization becomes, the weaker is the control over its actions exercised by those at the top." Williamson developed the concept further in his theory of transaction costs economics (1975, 1986).

Williamson (1971) was concerned with using a systematic, quantified version of the control loss model to explain the emergence of multidivisional structures. Williamson's model was based on the usual image of the organization as a tree (Evans 1975). Each boss has several subordinates. Their number constitutes his span of control. Each subordinate has only one boss. Goals are generated at the top of the

hierarchy; actions to implement them are executed at the bottom; in between there are several levels of hierarchy. At each level, bosses give orders to subordinates, which represent specifications or operationalizations of orders that they in turn have received from above. But at each level there is some slippage, some control-loss; orders are misinterpreted and part of the original intention is lost. Each level adds new control-loss to that of higher levels. The total, cumulated control-loss emerges at the bottom of the hierarchy as the proportion of production workers' time that does not further organization goals. The reduced observability in hierarchies gives rise to the risk of moral hazard and opportunism which is characterized by certain actions of employees such as shirking, cutting corners, consuming organization resources, or perpetrating fraud (Williamson 1967 and 1975, Williamson and Ouchi 1981). It is sufficient that only some employees behave in this fashion for the risk to become costly to the organization (Williamson and Ouchi 1981).

Abdel-Khalik (1993) says multilayer hierarchy in an organization creates several problems that can cause loss of control. First, observability of subordinates' actions decreases as the chain of command gets longer. Second, the longer the chain of command, the more likely that communication will get distorted, because of coding and because "the boss is not likely to be given information by his subordinates which will lead to decisions affecting them adversely" (Abdel-Khalik 1993, 35). Third, communication down the chain of command passes through several filters, which subject it to summarization, misinterpretation, and possible intentional manipulation. The

owner/manager is also constrained in communicating certain information down the chain, since it may be used by subordinates for shirking.

Reducing Control Loss

According to Ratliff et al. (1996), as organizations become larger, the total management function requires more people. At that point, more structure may be imposed upon the organization. Activities within the structure are subject to established policies, standards, and procedures, which can be thought of as a pervasive network of system controls, generally called internal controls. These control systems are employed to maintain effective control over activities and operations. The benefits of sound internal control systems include better decisions, morale, and timeliness, and reduced external audit fees (Means and Kazenski 1987).

Ratliff et al. (1996) assert that management's first economic concern is with the potential rewards that are available to the organization. The second concern, risk, is closely tied to the first and normally is just as important. Risk in this case means business and financial risk and it may be defined as any threat to the economic welfare of the organization. The greater the risk, the greater the need for management control. Management seeks to minimize risks by increasing system controls.

A recent survey (Pushkin and Morris 1996), finds that 56 percent of discovered frauds are caused by poor internal controls and management decisions to override internal controls as important factors in another 40 percent of discovered frauds. Their report also states that 59 percent of the frauds were detected by internal controls and that only 3 percent of all frauds were uncovered by external audit reviews.

After more than three years of studying internal control, COSO issued the report entitled *Internal Control-Integrated Framework* in September 1992. The COSO report reemphasizes the importance of internal controls in achieving an entity's objectives and provided the impetus for entities to refocus attention on their systems of internal control in an attempt to ensure responsible corporate governance and reliable financial reporting processes (Rezaee 1995).

Internal Auditing

Organizational decentralization leads to a need for management tools that will give managers the eyes and ears to monitor activities throughout the organization. According to Ratliff et al. (1996), management seeks assurance that the control systems are properly designed and functioning satisfactorily. If controls are inadequate and not operating properly, regardless of how well management has planned, the organization may be in danger of not achieving established goals and objectives. The most frequently cited process to ensure the adequacy and effectiveness of the entity's internal controls is the evaluation of such controls by internal auditors. Determining the adequacy of the control system is a matter of the internal auditor's professional competence (IIA 1991).

Internal auditing emerges from the management control function (Ratliff et al. 1996). The primary objective of internal auditing is to provide an appraisal of the organization's controls to ensure that business risk is addressed and that the goals and objectives are achieved efficiently, effectively, and economically (IIA 1991). The basic precepts of internal auditing rest on an understanding of organization management.

Internal audit is a feedback mechanism with the result that management has the ability to remedy any weaknesses in procedures before they have a significant effect on the overall internal control system and the financial condition of the organization (Adams 1994).

Internal auditors are viewed as an integral part of the internal control system of an organization (Schneider 1984). Auditing standards (AICPA 1988, 1991) document that the internal audit function is part of the control structure and must be included in the external auditor's understanding of the control structure. Gramling and Myers (1997) assert that within many organizations, internal auditors are considered internal control specialists and can expect management to look to them for assistance in implementing and maintaining the internal control system. They contend that as the focus on internal control structures has increased, the demand for internal audit services has increased.

The COSO report reinforces and re-emphasizes the proactive role of internal auditors in establishing and maintaining an adequate, effective, and efficient internal control system (Rezaee 1993). Sixty-five percent of the entities required to report on their internal control systems rely on the evaluation of internal controls by internal auditors. In comparison, 50 percent of those entities voluntarily reporting on their internal control systems rely on the evaluation of internal controls by internal auditors and only 44 percent of nonreporting entities rely on internal auditor's evaluations (Pushkin and Morris 1996).

Higher Education Control Loss

The expansion and complexity of operations in higher education institutions makes it increasingly difficult to monitor the effectiveness with which policies are being followed, objectives are being met, and control systems are functioning (Bethea 1992). Not only has management's need for information grown, but accountability for the appropriate and efficient use of institutional resources has become a matter of great concern to students, legislative bodies, government agencies, the general public, and all levels of institutional management. Internal audits evolved because institutional managers needed an independent evaluation of information relating to significant aspects of institutional operations. Internal audit departments currently serve as a major element of management control in colleges and universities (Johnson 1992).

Organizational Factors

Mayhew, (1973) maintains that although universities are usually described in simple terms, they are in fact among the most complex structures in modern society, in part because of their conflicting missions. He states that the university assumed its present form during the twelfth and thirteenth centuries as a location for convenient interaction of master and student. It was recognized early that this interaction required a degree of freedom to enable thorough examination of orthoxodies. Custodians of this freedom were students, professors, or ultimately, the board of trustees. As enrollments increased, universities became established as physical fixtures complete with properties, endowment, and the like; the growth of administration paralleled the growth of faculty.

Though the university, as an organization, possesses some attributes shared by other complex bureaucracies (executive officer, hierarchical alignment of positions, and policy-forming groups), in major respects it is sufficiently different (Mayhew 1974). Bethea (1992, 42) offers the following characteristics that distinguish higher education from other entities governed by profit motives:

1. The "public good" nature of some outputs of higher education precludes the operation of a free-market and market determined prices in higher education.
2. Poorly understood production processes in higher education prevent determination of an efficient conversion process of inputs and outputs.
3. Lack of incentive and reward structure limits efficiency.
4. Staff rigidities due to specialization and tenure, as well as the number of decisions made by faculty and students, limit managerial control in higher education.

As Brink (1980) notes, colleges and universities operate in a distinctive type of environment and have special types of objectives and operational problems. But there are many common concerns in all organizations. He asserts that like all organizations, colleges and universities need to define objectives and to then try to achieve those objectives through more definitive supporting plans and effective implementation. Fama and Jensen (1983) contend that separation of decision and risk-bearing functions observed in large corporations is common to other organizations such as large universities. They say that a common feature of the diffuse decision management and control systems of complex organizations (for example, large universities as well as large corporations) is a formal decision hierarchy with higher level agents ratifying and

monitoring the decision initiatives of lower level agents and evaluating their performance.

Fama and Jensen (1983) maintain that the common apex of the decision control systems of organizations, large and small, in which decision agents do not bear a major share of the wealth effects of their decision, is some form of board of directors. Such boards always have the power to hire, fire, and compensate the top-level decision managers and to ratify and monitor important decisions. A governing board usually controls colleges and universities (Spruill 1992). The fundamental document establishing the legal existence of the college usually entrusts the institution to a governing board. According to Spruill (1992) extensive delegation is necessary for a voluntary lay board to manage a college or university successfully. The board delegates authority to the president, who in turn delegates specific authority for various functions to his or her subordinates. As the delegation becomes more extensive, the organizational structure becomes more complex.

In complex, nonprofit organizations, Fama and Jensen (1983) observe mechanisms for diffuse decision control similar to those of other complex organizations. They note that large universities, like large open corporations, have complicated decision hierarchies and active internal agent markets with mutual monitoring systems that generate information about the performance of agents. In ratifying and monitoring decision initiatives presented by internal decision agents (presidents, chancellors, and provosts) and in evaluating the agents themselves, boards rely on information from the internal diffuse decision system. Fama and Jensen (1983) note that a university's trus-

tees are primarily donors rather than experts in the details of education or research. A more formal structure of diffuse decision management and control is helpful to trustees who do not have specialized knowledge about a university's activities.

Accountability in Higher Education

According to Hubbell and Dougherty (1992, 7), the traditional purpose of an internal control structure is to reduce the higher education institution's unintended exposure to business, financial, and accounting risks. Higher education institutions, like all businesses, face a variety of hazards. They include:

1. Business risks—such as the demand for, or profitability of, a new academic program; or the risk inherent in building a new research center, the cost of which is to be offset by indirect cost recovery on research grants not yet obtained or not guaranteed in the future.
2. Financial risks—such as vesting individual with the authority to sign checks or the management of cash receipts.
3. Accounting risks—such as the risk that miscategorized expenses could be significant enough to materially distort financial statements and skew decisions made from them, or the risk that categorization errors could result in the inclusion of inappropriate expenditures in overhead cost pools for indirect cost recovery.

Generally, internal auditors in higher education institutions focus on evaluating the financial and accounting risks of the organization.

According to Kearns (1998), colleges and universities serve multiple constituencies, perhaps to a greater extent than any other type of institution with the exception

of general-purpose governments. As such, these institutions are expected to follow practices that preserve the public trust and serve the public interest. He asserts that various constituencies expect resources entrusted to the campus to be managed prudently.

Higher education institutions have a responsibility to account for their activities. This accountability is inherent in the management process and is not always specifically identified by statutory or legislative provision (Manahan 1976). Expenditure patterns and revenue-generating capability are linked with demands for accountability (Balderstron 1974). Kearns (1998) discusses several constituencies that expect accountability from higher education institutions. As he points out, foundations, individuals, and corporations make sizable contributions to universities. Donors are reluctant to make contributions if they suspect gross waste in the way the institution manages resources. The Federal government is also concerned with efficient use of resources and adherence to numerous policy constraints.

Massy (1978) asserts that colleges and universities have come into the real world in terms of accountability, regulation, and a whole host of similar things that in the past were not considered important. They are no longer viewed by the government and by other constituencies in society as an "ivory tower." He describes a number of things have happened in the last decade or two that have changed this view. First, higher education has grown drastically. Before WWII higher education and the research that goes with it were relatively small. Now, colleges and universities are large, both in absolute and relative terms, and there is a very significant amount of federal

and state money going into higher education. The case for relative immunity to regulation is harder to make as size increases, and with substantial public funds comes accountability. So growth probably was a sufficient condition for the groundswell of change in society's attitudes toward higher education.

Pewitt (1982) says that in the 1970's, it became evident that the public in general still regarded colleges and universities as the vehicle to sustain a quality of life and a kind of society that is acceptable. However, it also became apparent that institutions were going to be held more accountable for the efficient and effective use of their resources. The additional accountability required that institutions establish their purposes and goals and articulate a clear strategy to reach them. The policies and procedures necessary to achieve the institutional purposes provide a much clearer basis for accountability, and moreover, gave the term meaning rather than remain a "coined word."

Governing boards have become more aware of their institutional responsibilities (Finn 1978). Concern has been increased by two major events:

1. The financial problems of institutions have frequently required crisis response on the part of trustees. These incidents have caused all board members to be much more sensitive and concerned about their overall fiscal responsibilities, how to assess them, and how to be assured of the accuracy of information and of the financial health of the institution.
2. Public concern and criticism of actions taken by corporations has led to placing the responsibility on the boards of directors of all types of organizations.

Such matters have increased the sensitivity of trustees about ways in which they can monitor and check to be assured that the institutions for which they are responsible are accurately reporting their finances and that they are in compliance with federal law and are meeting other accountability standards expected by society (Finn 1978). According to Kearns (1998), the standards of accountability, both explicit and implicit, are dynamic components of any institution's strategic environment. The standards of accountability should be continuously monitored and incorporated into the institution's strategic management process.

According to Bethea (1992) and Drucker (1975), the use of internal auditing by institutions of higher education is a relatively recent phenomenon. Although the history of internal auditing for colleges and universities goes back to the early part of 1950, it was in 1968 that it gained significant recognition. At that time, the American Counsel on Education provided what was essentially the only guidance on accounting and financial reporting for colleges and universities (Spruill 1989). The 1968 edition of *College and University Business Administration* (American Counsel on Education) listed 22 basic principles of accounting and financial reporting in its statement of objectives for internal auditing for colleges and universities. One of those principles stipulated provisions should be made for internal control and audits.

Accountability in higher education has increased immeasurably administration's need for internal auditing (Pewitt 1982). Government agencies, donors, students, and faculty want assurances that funds are spent wisely, equitably, and legally. Audits serve that end (Bethea 1992). Demands for greater accountability in higher education

and cost consciousness on the part of state legislators, alumni governing boards, and the general public have placed the internal audit function more and more in the fore-front as a part of the administrative team (Manahan 1976).

According to Traver (1991), an excellent university reputation is built through many years of patient effort and any small departure from established policies might nullify many years of prior work. Students and alumni follow many of the activities of a university very closely; therefore, any departure from sound administrative practice is almost certain to receive wide publicity. He asserts that when a university adopts sound policies, and the internal auditor regularly verifies that operating personnel are carrying out these policies, the probability of unfavorable public relations is mini-mized.

Summary

This chapter explains what internal control does for an organization and how the internal audit function helps an organization avoid loss of control. A summary of the factors that contribute to control loss in a university setting is discussed. Finally, a brief history of internal audit in higher education is presented.

CHAPTER III

MODELING THE DEMAND FOR INTERNAL AUDIT IN HIGHER EDUCATION INSTITUTIONS

This chapter discusses the development of the model used in this study. This chapter is presented in six sections. The first section describes the growth of internal auditing in higher education. The second section presents the model developed in the current study. Section three describes the constructs tested in the model, the variables that provide a surrogate measure for the constructs. The research hypothesis for each variable is presented in section three, also.

Modeling the Demand for Internal Audits in Higher Education

According to internal audit and higher education literature (Bethea 1992; Johnson 1992; Manahan 1976; Spruill 1989; Traver 1991) the need for internal auditing has increased substantially, primarily due to:

1. The growth in size of organizations which requires more and more delegation of responsibility.
2. Growth in the complexity of administration-due to the increasing relationship with federal and state agencies and the resulting government controls and regulations, which requires more administrative structure to assure compliance.
3. Increasing pressures of student numbers, adding greater emphasis to the efficient use of space and more demands on the administrative structure.

4. Increasing accountability, due to the increasing costs of education and the taxpayers' increasing concern about the need for efficient operations.

According to Bethea (1992), the expansion and complexity of operations in higher education institutions makes it increasingly difficult to monitor the effectiveness with which policies are being followed, objectives are being met, and control systems are functioning. Not only has management's need for information grown, but accountability for the appropriate and efficient use of institutional resources has become a matter of great concern to students, legislative bodies, government agencies, the general public, and all levels of institutional management. Internal audits evolved because institutional managers needed an independent evaluation of information relating to significant aspects of institutional operations that was more detailed and more frequent than external auditors normally could provide. Johnson (1992) asserts that internal audit departments currently serve as a major element of management control in colleges and universities.

The Model in the Current Study

While the increased demand for internal audit and the related causes for the increased demand are frequently cited in the literature, the literature is based on assumptions that have not been empirically tested. This study is the first effort to identify and test a descriptive model of factors that influence the demand for internal audit in U. S. colleges and universities. The model developed in this study examines how the demand for internal audit in higher education is impacted by the size and complexity of each organization, accountability issues faced by each organization, and the

effectiveness of each organization's internal audit function. The demand for internal audit is measured by the number of audit professionals in each institution. The size of the organization is measured by the number of full-time equivalent students in each institution. Organizational complexity is measured using the Carnegie Classification. The Carnegie Classification ranks the complexity of higher education institutions based on their mission and programs, with a ranking of ten for the most complex and a ranking of one for the least complex.

Higher education institutions are dependent on numerous groups outside the organization for support and are accountable to those organizations. Issues that are identified as having significant impact on the demand for internal audit are federally sponsored programs, National Collegiate Athletic Association (NCAA) athletic programs and medical education programs. The first accountability issue, regulations governing receipt of federal funds for student aid and research, is measured using the total federal dollars received by each institution. The second accountability issue, NCAA oversight of athletic programs of member institutions, is measured using an ordinal variable according to the programs ranking within the NCAA, with four assigned to the highest ranking, Division I-A; and one assigned to the lowest ranking, Division III; and a zero assigned to institutions that were not NCAA members. The third accountability issue, government oversight of medical education programs, is measured by a dichotomous variable where one is assigned to institutions with medical programs, and a zero assigned to those institutions without a medical program. Public institutions may be more accountable to the public and state legislatures because they receive state

funded support that private institutions do not receive. A dichotomous variable measures the greater accountability faced by public schools, with a one assigned to public institutions and a zero assigned to each private institution.

The effectiveness of the internal audit function may affect management's demand for internal audit services. Previous studies (Abdel-Khalik et al. 1983; Brown 1983; Schneider 1984; Maletta and Kida 1993) find that the effectiveness of the internal audit department affects the external auditor's demand for internal audit. This study relies on the criteria used by external auditors (SAS 65) to evaluate internal auditors, which include the objectivity, competence and work performance of the internal audit function. In external audit studies, objectivity is measured by the reporting status of the internal audit function in the institution, with reporting to the governing board being the highest reporting status (Brown 1983; Schneider 1984; Maletta and Kida 1993). Objectivity is measured using an ordinal variable where eight, the highest ranking, is assigned to those institutions reporting to the Board of Trustees, the highest reporting status, and a one is assigned to the institutions with the lowest reporting level, which is classified as "other" and includes responses that are at levels considered lower in the organization than the controller. One example is the assistant controller. Competence is measured using average number of years of experience of the internal audit staff and percent of audit staff with auditing or accounting certification. Finally, work performance is measured by the percent of internal audit recommendations implemented by management.

Demand for Internal Audit

As the demand for internal audit increases, the resources an organization commits to the internal audit function also increases (Bethea 1992; Traver 1991). In this study, the number of internal auditor professionals employed by the organization provides a surrogate measure of resources committed for the internal audit function. This number includes any contracted or outsourced auditors. The number does not include internal audit support staff employed by the institution. By using number of auditors, this study associates the audit demand (audit coverage) with available auditors. Also, using the number of internal auditors rather than internal audit costs avoids systematic differences in costs associated with the geographical location of an institution and its status as a public or private institution (McPherson et al. 1996).

Organizational Characteristics

Size

Previous studies find that organization size is associated with the demand for internal audit. Studies link the "control loss" phenomena to firm size (Williamson 1967, 1971; Evans 1975; Calvo and Willisz 1978). As an organization increases in size, it increases in differentiation, which creates a control problem of integrating the differentiated subunits. As organizations grow larger, the number of levels in the hierarchy increases, thus, compounding problems of control loss (Evans 1975). With large size also comes horizontal differentiation, or more divisions and departments, each with a specialized task that differs from the specialized tasks of the other units. This horizontal differentiation makes the comparison of measures of performance more

difficult. Size brings on a greater danger of control loss and leads to the development of output measures that minimize the control loss (Ouchi 1977).

As the size of an organization increases, and the potential for loss of control increases, management must take steps to improve the organization's internal control systems in order to achieve organizational goals and objectives (Ratliff et al. 1996). Williamson (1986) posits that size brings on a greater danger of control loss and leads to the development of output measures, which minimize the control loss. According to Williamson, it is internal audit's role to monitor the effectiveness of the measures. Some studies postulate that larger firms have better internal control systems and internal audit departments (Kinney and McDaniel 1989; Defond and Jiambalvo 1991).

One study finds that the establishment of internal audit departments is associated with other fixed costs, and investing in internal audit departments increases with organization size (Anderson et al. 1993). Also, larger organizations usually enter into more financial transactions, thereby requiring more audit time (Rubin 1988).

Traver's (1991) data illustrates that as colleges and universities get larger in terms of student enrollment, employees, and budget dollars, the audit staff gets larger to provide additional review and consultation resources for management. Student enrollment has a direct impact on institutions' overall budgets (Bethea 1992). Institutions using formula budgets often factor student enrollment into their calculations either as full time equivalent (FTE) or in some pro-rata consideration. Increased student enrollment increases system requirements needed to process student data and files (Manahan 1976). This places an additional load on auditing by requiring additional

examination of administrative and processing controls, thereby increasing the audit/student ratio (Traver 1991). Bethea (1992) finds a correlation between audit staff size and organization size when size is measured by the institutional operating budgets

Based on the extant literature, this study predicts that organization size will have a positive and significant effect on the demand for internal audit in higher education. The prediction is operationalized by the following, alternative-form research hypothesis:

H_1: The demand for the internal audit function in an organization will increase as the size of the organization increases.

In most private sector audit fee studies, size is measured by either assets or revenues of the firm (Simunic 1980; Palmrose 1986). However, for colleges and universities, neither of these constructs appear appropriate because of the differences in the way private and public institutions account for various transactions. Often colleges and universities prepare financial information in ways that do not easily allow comparisons between them (KPMG Peat Marwick 1991). Many institutions make no attempt to eliminate interfund accounts receivable and payable, thus inflating assets. Since the age of a college or university can be hundreds of years, with fixed assets dating to the inception of the institution, total assets of different universities can be fraught with systematic differences (Gordon et al. 1997). Gordon et al. notes that public institutions follow generally accepted accounting principles as promulgated by the Governmental Accounting Standards Board, which does not require depreciation of plant assets. Private institutions follow generally accepted accounting principles as

promulgated by the Financial Accounting Standards Board, which requires depreciation of plant assets. Rubin (1988) examines demand for audit services in municipalities. He posits that for public sector entities, a financial measure of size may contain relatively more noise than an alternative size measure such as population. For colleges and universities, a nonfinancial measure of size would be number of students or number of employees (Gordon et al. 1997; Johnson 1992; Schipper 1977).

In the current study, the variable STUD is used as the construct for size, and is measured by FTE enrollment per institution (Gordon et al. 1997; Johnson 1992; Schipper 1977).

Complexity

The control loss phenomenon also has been related to organizational complexity (Williamson 1986; Ouchi 1977). Fama and Jensen (1983) observe that most small organizations tend to be noncomplex, and most large organizations tend to be complex, but the correspondence is not perfect. For example, research-oriented universities, though often small in terms of assets, number of students or faculty size, are nevertheless complex in the sense that specific knowledge, which is costly to transfer, is diffused among both faculty and administrators (Fama and Jensen 1983). Using the organization as a unit of analysis, Ouchi (1978) seeks to uncover the relationship between structure and control. His results show that approximately 33 percent of the variance in control can be accounted for by complexity. Rubin (1988) notes that more complex organizations require additional audit time because of coordination costs and

increased variety of transactions and internal control systems that the auditor may need to study and evaluate.

Williamson (1986) develops several organizational models that reflected internal (hierarchical) controls based on the complexity of the organization form. Williamson's models are based on unitary or divisional structure of the firm. Williamson's models do not fit the organizational structure of higher education. However, organizational theories for higher education structures have been developed. There are four traditional organizational models of higher education (Traver 1991). Those models are the bureaucratic, collegiate, political, and organized anarchy.

A bureaucratic structure is vertical in nature providing a hierarchy of authority. Authority exists from the top of the organization (Bolamn and Deal 1984). The bureaucratic model focuses on finding the right pattern of roles and relationships to achieve organizational needs. A bureaucratic organization is a closed system with fairly explicit goals. Therefore, it can operate with a high degree of certainty and predictability. The organization of a community college would be an example of a bureaucratic model in higher education (Traver 1991).

The collegial organization (Corsan 1975) model of a higher education institution is characterized by two internal structures, academic and administrative and a flat or horizontal organizational structure. The collegial model assumes that conflict is not functional and can be eliminated through consensus-oriented discussions. Teaching and student advising are emphasized. The campus is the center of educational and social activity for both the students and the faculty. Decisions of a professional nature are the

responsibility of the faculty. The best example of the collegial model is a small liberal arts college (Traver 1991).

The political model is a model that includes consensus factors and bureaucratic processes, and also addresses power plays, conflict, and the politics of a large university (Baldridge 1971). Authority is limited by political pressure that various groups exert. Decisions are often negotiated compromises between competing groups. Political systems have many sources of power. The president of an institution is a leader, but not the only leader. Representatives of each of the various coalitions represent their own interests, and will maneuver for power in a given situation (Birnbaum 1988). Individuals and groups interact through negotiation and compromise as objectives and interests change. An example of a political model would be a medium to large state university (Traver 1991).

The organized anarchy model is viewed as possessing four fundamental ambiguities, including ambiguity of purpose, power, experience and success (Millet 1978). Lines of authority are considered blurred and confused. Leaders do not lead so much as channel the institution's activities in subtle ways (Baldridge et al. 1977). The organization is staffed with autonomy-demanding professionals who want to make their own decisions. An example of a model of organized anarchy is a major research university (Traver 1991).

Based on the extant literature, it is predicted in this study that increases in the level of complexity of the higher education institution will have a significant and posi-

tive effect on the demand for internal audit in that institution. The prediction is operationalized by the following, alternative-form research hypothesis:

H_2: The demand for the internal audit function in an organization will increase as the complexity of the organization increases.

The higher education organizational models represent theoretical organizations, which have different environmental characteristics such as number of employees, numbers of units and subunits, and budgets. A more precise classification of higher education organizational models than the theoretical models is the Carnegie Foundation classification. The primary purpose of the development of the Carnegie Classification is to improve the precision of research related to higher education institutions (Traver 1991). The basis for the classifications is institutional mission and educational function. By keeping definitions of the basic classifications unchanged, it is considered possible to identify changes that occur in higher education. The Carnegie Classification has been used to rank or classify organizations in previous higher education studies (Traver 1991; Koshal and Koshal 1995).

Generally, organizational complexity of a college or university is determined by the highest level of degree they award, and the type and level of research that is conducted at the institution. Organization complexity of colleges and universities is measured annually according to the Carnegie Classification developed by the Carnegie Foundation. Carnegie's classification system dates to 1973. Institutions are classified according to the highest level of degree they award, the number of degrees conferred by discipline, the amount of federal research support they receive, and the selectivity of

their admission. Enrollment (size) is not a factor. According to Carnegie Foundation President Boyer (Evangelauf 1994, A17), "The classification is not an attempt to build a pyramid in terms of quality. It doesn't talk about quality, or a hierarchy in terms of good or bad. It talks about the level of complexity of programs."

The ten Carnegie Classification categories, listed from the most complex to the least, are as follows: research universities I, research universities II, doctoral universities I, doctoral universities II, comprehensive I, comprehensive II, baccalaureate I, baccalaureate II, associate of arts colleges, and professional schools and specialized institutions. A description of each category is included in Appendix A.

In this study, the construct organizational complexity is measured with a categorical variable, COMP, ranking higher education institutions. The ranking is based on the level of complexity of the institution in accordance with the Carnegie Classification, with the most complex category, Research I institutions, given a ranking of ten, and Research II institutions given a ranking of nine. The ranking continues in descending order to the category of institutions that are considered the least complex, professional schools and specialized institutions, which are given a ranking of one. The Carnegie Classifications and rankings assigned in this study are presented in Table 3.1.

Table 3.1

Carnegie Classification Values

Carnegie Classification Designation	Value for COMP Variable
Research I	10
Research II	9
Doctoral I	8
Doctoral II	7
Masters I	6
Masters II	5
Bachelor I	4
Bachelor II	3
Community Colleges	2
Professional and Specialized Schools	1

Accountability Issues

Colleges and universities face serious consequences from the loss of reputation. Therefore, accountability to the public may be of greater concern to institutional boards and management than traditional risk factors. For purposes of this study, four accountability issues are identified that may have a significant impact on management's reliance on the internal controls of the organization. Those four issues are: (1) government oversight of institutions receiving federal funds for student aid and research; (2) National Collegiate Athletic Association (NCAA) oversight of member institution's athletic programs; (3) federal government oversight of medical education programs and (4) the additional public and legislative oversight of public institutions.

Studies consistently find size, complexity and risks associated with an organization to be determinants of demand for external audit services (Simunic 1980; Palmrose 1986). According to Gordon et al. (1997), measures of risks associated with private sector organizations, such as leverage, are not as meaningful when studying colleges and universities. Many public colleges and universities do not include plant debt in their financial statements because such debt is the responsibility of state agencies. Also, leverage is difficult to analyze in higher education because of variations in the accounting standards that the various institutions follow. Some public institutions do not follow the generally accepted accounting principles for colleges and universities as specified in authoritative literature. Instead, they use the accounting principles of state and local governments. Private institutions depreciate their plant assets, and some public institutions do not.

Risks for higher education institutions may be associated with loss of reputation. According to Schramm (1975), any organization which is not self-sufficient, but which relies on the support of groups outside the organization must conform to and place emphasis on those aspects of organizational performance deemed most important by the support of outside groups. Complex organizations are most alert to and emphasize good performance in those areas that are most visible to groups outside the organization that provide support. "Here arises a notion of the importance the organization attaches to scoring well on the measures that are visible and significant to those groups and individuals who support the organization" (1975, 89).

Kearns (1998) asserts that institutional accountability may be of greater concern to institutional boards and management than traditional risk factors. The broader concept of institutional accountability involves more than measuring and reporting tangible aspects of operational performance. Institutional accountability refers to the myriad expectations—some tangible, other intangible—that are applied to colleges and universities by diverse stakeholders. All of these demands are based on the assumption that colleges and universities are public serving organizations, engaged in the production of public goods with direct or indirect financial support from the general public.

Kearns (1998) goes on to say that standards of accountability for colleges and universities may be formally codified in laws and regulations, while others may be defined by implicit expectations of a diverse set of stakeholders. For colleges and universities, significant accountability would be associated with those areas subject to extensive compliance and reporting requirements. Management relies on internal audit to provide an acceptable level of assurance on the effectiveness of internal controls and to detect and report any significant weaknesses in controls. Research has shown that the presence of an internal audit function may reduce qualified audit reports by external auditors (Wichman 1985).

Massy (1978) identifies factors that internal auditors in higher education should consider when determining areas to audit and evaluating the consequences of leaving other areas unaudited. The following factors should be given careful consideration:

1. Audits that are necessary for meeting external requirements. Of necessity, these should be given highest priority. Examples of such are legislation, agency regulations, and contractual agreements.
2. Areas where noncompliance with guidelines could result in severe penalties to the institution. The extent of outside regulation is also a factor here and influences the priority of these areas.

Following Massey's guidelines, there are three functions in colleges and universities that are subject to significant compliance, investigative and reporting requirements from external sources (explicit accountability) and to significant public scrutiny (implicit accountability). These are federally sponsored programs for research and student financial aid, NCAA athletic programs, and academic medical programs.

Federally Supported Programs

Norris (1992) points out that sponsored programs demand stewardship and accountability in the management of funds on behalf of the external sponsor. Generally, sponsored-program funds have extensive reporting and management requirements connected with them, as well as specialized technical reporting and administrative support requirements. Norris maintains that the complexity of sponsored-program activities and their impact on the host institution cannot be overestimated. Demands on space, facilities, cash flow and personnel are far greater than the demands of academic programs and must be carefully considered.

Spruill (1992) asserts that the federal government has a multifaceted interest in how universities use resources. Since the mid-1970s, failure to comply with federal

regulations has had serious consequences for some institutions. Significant federal agencies have audit relations with universities, and other agencies also have an impact on the audit process. Failure to comply with regulations and standards can lead to serious problems in colleges and universities. During the past decade, significant changes have occurred that require increased attention to internal control in governmental units, including the Single Audit Act of 1984. Auditors of recipients of federal funds subject to the Single Audit Act (SAA) are faced with greater complexity than auditors of private sector entities. These auditors are required to make at least three reports: (1) the financial statement audit report; (2) the SAA internal control report; and (3) the SAA report on compliance with laws and regulations (Cox and Wichman 1993). In the case of deficiencies, an institution may be required to improve its systems or refund federal dollars, or in the most serious cases, be barred from future funding. The U. S. General Accounting Office's (GAO) revisions of Government Auditing Standards in 1994 continued its emphasis on the importance of internal controls in audits of universities' receiving government funds (Verschoor 1997).

Kearns (1998) identifies a watershed event, which thrust the topic of institutional accountability into the public eye. That occurred in 1990 when Representative John Dingell turned the attention of the House Commerce Committee to the question of whether colleges and universities were appropriately spending overhead funds charged to federally sponsored research projects. According to Kearns, the Dingell Committee left many citizens wondering who was minding the store and whether existing mechanisms were sufficient to serve the public interest and protect the public trust.

Audit requirements have become more stringent in several areas and should be carefully managed by the institution (Norris 1992). Office of Management and Budgets (OMB) Circular A-133 establishes audit requirements and defines Federal responsibilities for implementing and monitoring such requirements for institutions of higher education and other nonprofit institutions receiving Federal awards. Two factors, the relative size of the federal award programs and the compliance requirements applicable to programs, determine the scope of the auditor's work and the reports to be issued in an audit of federal awards under Circular A-133 (Coopers & Lybrand 1994).

Norris (1992) points out that some public, state-supported or -assisted institutions have been made subject by their state to the requirements of OMB Circular A-128, "Audits of State and Local Governments," in lieu of the requirements of Circular A-133. Although the general requirements are the same, audits under Circular A-128 are required to be performed at least annually (Norris 1992). Both circulars permit coordination among the federal audit agency, the institution's independent auditor, and its internal auditor (Spruill 1992). Both require an evaluation of the entity's internal control system. The GAO's revisions of Government Auditing Standards in 1994 continued its emphasis on the importance of internal controls in audits of universities receiving substantial government funds. Internal audit is a part of the internal control system. Therefore, the internal audit department plays a key role in the assessment of the internal control system.

Spruill (1989) finds that major research universities have responded to concerns about the administration of U.S. sponsored programs. In his study, external audit fees

and internal audit budgets both show a strong relationship when compared with grant and contract revenue. He also finds a high level of compliance auditing by the internal audit staffs, and concludes that was due to the concerns about administration of sponsored research.

Explicit accountability standards for colleges and universities may be related to extensive compliance requirements and externally imposed audits. Implicit accountability standards may arise from public disclosure of adverse findings from external audits. The first of these is the Office of Management and Budgets Circular A-133 audit. This audit is required for recipients of federal support for sponsored research, federal student financial aid, and other major programs. The relative size of federal award programs has a significant impact on an institution's administrative support structure, the external auditor's scope of work, and the demand for internal audit. It is predicted that the amount of federally sponsored programs administered by an institution will have a positive and significant effect on the demand for internal audits in the higher education institution. The prediction is operationalized by the following, alternative-form research hypothesis:

H_3: The demand for the internal audit function in an organization will increase as the total amount of federally sponsored programs increases.

The first accountability construct, federally sponsored programs, is measured by the variable FED$, which is the total amount of federal dollars received by each institution in fiscal year 1996 (Spruill 1989).

Athletics

Spaulding and Eddy (1996) contend that one of the most visible activities in colleges and universities today is the athletic program. College sports are big business. Millions of dollars generated from sports come to universities and college each year. The magnitude of this revenue can be seen in one event—the NCAA basketball tournament or "Final Four." In 1985, this tournament earned revenue of $20.1 million, in 1995 $141 million, and over the next seven tournaments it is expected to average $215.6 million a year. This revenue magnitude can also be seen in college football. It has become obvious over the years that the huge amount of revenue generated by college sports can distort the whole that is college athletics.

According to Mahony and Pastore (1998), not every institution with a NCAA athletic program makes money from the program. However, the average profit ($3.883 million in football; $1.637 million in men's basketball) at the 67 percent of the schools that make money is much larger than the average losses ($1.02 million in football, $226,000 in men's basketball) at the schools that do not. Institutions at the Division IA level receive 90 percent of their sports team revenue from these two programs.

The empirical results of one study (Grimes and Chressanthis 1994) suggest that the athletic success of a school's overall sports program can positively influence the level of alumni giving to the academic side of the institution. Intercollegiate athletics generate a spillover benefit to the university. They find that contributions are positively related to the overall winning percentage of the intercollegiate sports program

and television appearances. Their results also suggest that sanctions imposed by the NCAA rules violation may slightly reduce contributions to academics.

Those in favor of intercollegiate athletics argue that a successful sports program draws students, provides "brand name" advertisement and identification for the school (McCormick and Tinsley 1987), and attracts alumni contributions and endowments that otherwise may not be donated. Coughlin and Erickson (1984) find that several measures of athletic success including, attendance, post-season play, and winning percentage, are significant determinants of monetary contributions to a school's athletic program.

Brooker and Klastorin (1981) find a significant positive relationship between athletic success and annual fund contributions when institutions are analyzed within homogenous groups. McCormick and Tinsley (1987) estimate that a 10 percent increase in donations to the athletic booster club is associated with a 5 percent increase in contributions to academics, supporting the hypothesis that athletic success may create an external benefit for the academic programs of an institution. Mixon and Hsing (1994) find that successful athletic programs are important in attracting non-resident students to colleges and universities across states.

The NCAA is the private organization charged with developing and enforcing the rules that govern intercollegiate athletics (NCAA 1996a). The NCAA provides oversight for all member institutions. Member institutions are subject to a multitude of complex eligibility requirements, as well as a financial audit requirement. NCAA

sanctions against an institution's athletic program can be costly if the institution's supporting public loses confidence in the institution and its administrators.

Grimes and Chressanthis (1994) contend that the NCAA scholarship rule structure creates incentives for cheating. Institutions and athletic boosters may be tempted to offer benefits beyond the imposed limits to secure an athlete's services since all NCAA member schools are restricted in the amount of financial aid they may provide an individual athlete. To discourage cheating, NCAA imposes severe economic sanctions on teams that have been detected and convicted of rules violations. In addition to restricting future scholarships, most sanctions take the form of banning teams from appearing on television or in post-season play. Television exposure of an institution's sports program is found to be associated with higher levels of contributions. Evidence indicates that NCAA sanctions for rules violation may negatively influence alumni donations

Problems of lack of integrity and financial abuse have been of concern to presidents and chancellors who represent National Collegiate Athletic Association (NCAA) member institutions. In a survey conducted by the National Association of College and University Business Officers (NACUBO 1985), 96 percent of the chief executive officers polled believed the chief executive officer should have ultimate control over the athletic budget. The survey polled 791 member institutions. Of these, 99 percent were concerned about problems of integrity and 60 percent were concerned with demands to generate income in NCAA Division I sports. The NCAA approved legislation requir-

ing independent audits and presidential control of athletic budgets. An independent auditor must conduct the audit (Spruill 1989).

The primary purpose of the NCAA financial audit is to ensure that CEO is made aware of all recorded expenditures for athletic purposes and is intended to assist the institution in exercising control over expenditures made for or in behalf of the intercollegiate athletics programs (NCAA 1996c).

Financial audits of NCAA member institutions' intercollegiate athletics programs are mandated under the provisions of the NCAA constitution. The NCAA requires that all expenditures for or in behalf of an institution's intercollegiate athletics program, including those by outside entities, be audited by an individual outside the institution selected by the institution's CEO or his designee. Division I schools must have an annual audit, Division II at least once every three years, Division III only required to include athletic revenue and expenditures associated with outside groups in the annual NCAA financial audit.

NCAA membership level determines the frequency of the annual financial audit, and the compliance requirements for each program. NCAA membership level is determined by a set of criteria for each division.

Division I (NCAA 1996a) must sponsor at least seven sports for men and seven for women, with two team sports for each gender. There are contest and participants minimums for each sport, as well as scheduling criteria. For sports other than football and basketball, Division I schools must play 100 percent of the minimum number of contests against Division I opponents. For football, Division IA teams have to meet

minimum attendance requirements (17,000 per home game, or 20,000 average over 4 years). Division IAA teams do not need to meet minimum attendance requirements. Division I schools must meet minimum financial aid awards for their programs, and there are maximum financial aid awards for each sport that a Division I school cannot exceed.

Division II (NCAA 1996b) schools must sponsor at least four sports for men and four sports for women, with two team sports for each gender. Football and men's and women's basketball must play 50 percent of their games against Division II or I opponents. There are no attendance requirements. There are maximum financial aid awards for each sport that a Division II school must not exceed. Division III institutions have to sponsor at least four sports for men and four for women, with two team sports for each gender. Football and men's basketball must play more than 50 percent of all games against Division III schools or schools that grant financial aid based on need only. Division III institutions do not award financial aid on the basis of athletic ability—only on the basis of need.

Participation in NCAA athletic programs represents the second area of explicit and implicit accountability standards facing colleges and universities. As the level of athletic program participation increases, the level of compliance requirements and the frequency of the financial audit increases. In this study, it is predicted that the as the level of accountability related to NCAA program participation increases for an institution the demand for internal audit services will increase significantly. The prediction is operationalized by the following, alternative-form research hypothesis:

H_4: The demand for the internal audit function in an organization will increase as the level of NCAA participation of the higher education organization increases.

The construct is measured with NCAA, a categorical variable ranking NCAA athletic participation, where four equals Division IA, three equals Division IAA, two equals Division II and one equal Division III, and a zero is assigned to institutions in the study that did not have NCAA membership (Mixon and Hsing 1994). The NCAA Division levels and the related rankings assigned in this study are presented in Table 3.2.

Table 3.2

NCAA Membership Level Values

NCAA Division Level	Value for NCAA Variable
Division IA	4
Division IAA	3
Division II	2
Division III	1
Nonmembers	0

Medical Education Programs

The third area with significant accountability standards for a college or university is an academic medical program. Millington (1987) asserts that teaching hospitals today are places of business, with bottom lines, debt issues, and markets. Their success doesn't necessarily hinge on the long-term effect of granting privileges to a particular

physician in the same way that the future enrollments and sponsored research funds accrue to the academic department that recruits a Nobel laureate. He maintains that risk management plays a large part in the hospital's activities, to a far greater extent than it does in most teaching and research activities of the colleges.

Montague and Pitman (1996) say the cost competition sweeping through the United States health care system presents special hazards for the nation's academic health centers. Teaching hospitals once enjoyed the best possible debt ratings thanks to their size, reputation and market strength. But the nation's shift to managed care is putting many at a financial disadvantage. Their bloated costs, overspecialization, teaching and research missions, and high numbers of uninsured patients are major drawbacks in a market that is demanding more cost-effective care. Academic medical centers' costs run 30 to 40 percent higher than community hospitals (Montague and Pitman 1996).

In addition to funding problems, academic medical centers face a number of government regulations, compliance, and fraud issues. Regulations cover issues including patient privacy, drug and device usage, billing practices, Medicaid and Medicare claims, and insurance claims (Eiland 1993). Millington (1987) notes that numerous federal and state agencies are involved in medical care regulation, including the Department of Health and Human Services (DHHS). The Federal government places so much importance on compliance that their investigators have been sent to visit numerous hospitals. Violations subject perpetrators to monetary fines and criminal prosecution. Academic medical centers are taking care to ensure compliance.

Internal auditors at these medial centers have been working with administration to ensure the medical centers are in compliance (Serbaroli 1994).

According to Eiland (1993), the laws commonly referred to as the Medicare and Medicaid fraud and abuse laws, provide criminal penalties for those who knowingly and willfully offer, pay, solicit or receive any remuneration in order to induce referrals or trade which are reimbursed under the Medicare or Medicaid Programs. The penalties for violating the statutes include fines of up to $25,000, imprisonment for up to five years, or both. The Statute is intended to deter and punish any patient referrals, which may be either excessive or unnecessary or directed to a specific provider for financial, rather than patient care motives.

Stohl (1998) notes that the justice department reported that its healthcare fraud caseload nearly quadrupled from almost 365 cases pending investigation in 1992 to 1,300 pending cases in 1993. Health care and related benefits administration has always been considered a high-risk area. The first audit of the Medicare program by HHS OIG found that fraud, abuse, and errors accounted for 14 percent of program allocations, and found problems with 30 percent of claims reviewed. Uncovering medical fraud, estimated in Congressional studies to total as much as $80 billion to $100 billion per year, has been a top priority of the Clinton administration and was mentioned prominently in the president's 1994 State of the Union address (Serbaroli 1994).

Weissenstein (1997) notes that the Department of Health and Human Services has been auditing teaching hospitals to determine if they're upcoding or billing Medicare for the services of medical residents, neither of which is allowed. Two academic

facilities have paid multimillion-dollar settlements so far, and the department is still conducting audits in 33 states. Referred to as "PATH" (Physicians at Teaching Hospitals) the probe focuses on how teaching hospitals and faculty practice plans bill Medicare for the work of medical residents. The investigation was broadened to include a review of whether teaching hospitals exaggerate the severity of patient's illnesses to increase their Medicare reimbursements.

The inquiry has resulted in two settlements totaling $42 million (Weissenstein 1997). Roberts (1996) reports that the University of Pennsylvania health system agreed to pay back $30 million to Medicare, the US government insurance plan that covers elderly patients and pays for doctors in training. He explains that according to federal rules, Medicare pays for trainee's salaries and for some of their teaching, but it does not pay for the medical services that they deliver. Trainees are supposed to be supervised by senior doctors, who are allowed to bill the government and other insurers. The Department of Health and Human Services Office of Inspector General is scrutinizing Medicare bills for care by faculty doctors that are actually handled by residents, whose services are already reimbursed under Medicare graduate medical education payments.

A Cooper & Lybrand (1998) survey of health care consultants finds that government regulations/compliance/fraud and abuse is the number one issue in their list of top ten health care issues. Numerous investigations are proceeding on other fronts. Recently, the inspector general of DHHS issued subpoenas to 135 prominent teaching

hospitals throughout the country as part of a major investigation into the incidence of cardiac procedures and the uses of a wide variety of cardiac devices (Serbaroli 1994).

Serbaloi (1994) asserts that because of the publicity related to healthcare reform, the Federal initiative on healthcare fraud has broad public support, and prosecutors have a strong mandate to pursue investigations. In the healthcare arena, every provider is a potential target. As s result, a compliance program has become as necessary a function for healthcare providers as quality assurance, utilization review, internal audit, and risk management. Providers who have established a comprehensive and aggressive internal compliance program, akin to an internal audit function, can substantially mitigate their exposure to criminal liability.

Eiland (1993) notes that health care reform is already taking place through state legislative action and increased enforcement action, especially in the areas of health care fraud and abuse and physician self-referral prohibitions. Investigations that arise out of these enforcement actions can involve large sums of money, take years to resolve and can severely impact a college or university.

The internal auditor plays an important role in handling an internal or external investigation (Serbaroli 1994). The complexity of health care fraud and abuse and similar cases requires the quick determination of a variety of strategic and legal issues during the course of the civil or criminal investigation. These issues include the civil monetary penalty, exclusion, and/or criminal prosecution process, and corollary civil litigation that may ensue (Eiland 1993).

The third accountability issue faced by colleges and universities, and impacting the demand for internal audit is associated with whether or not the institution has a medical education program. It is predicted that the existence of a medical education program increases the demand for internal audit services significantly. The prediction is operationalized by the following, alternative-form research hypothesis:

H_5: The demand for the internal audit function in an organization will be higher if the college or university has a medical education program.

This third accountability construct is measured using a dichotomous variable MED, with a one denoting a university that has a medical education program, and a zero denoting a college or university without a medical education program (Koshal et al. 1994).

Public versus Private

Gordon et al. (1997) assert that private colleges are more dependent on tuition and donor support than public institutions. Public institutions are dependent on tuition and donor support for funding; however, they receive support from the public through appropriated state revenues. Public institutions are unique in their relationship to the state government. They are subject to state policies governing their relationship with the state auditor. Because of the public support afforded these institutions, there may be increased monitoring on the part of the state because of the increased proportionality of their stake in the financial and operational affairs of the school (Gordon et al. 1997).

As Gordon et al. (1997) emphasize, accountability by private nonprofit colleges and universities entails unique issues because these institutions are not subject to the

electoral control which holds government accountable and because they are often insulated from the market forces that discipline business entities due to their (sometimes) extensive endowments. Public institutions may be exposed to greater political costs, due to the greater number of constituents to which they are responsible, including taxpayers, the legislature, and assorted politicians, in addition to students, alumni, bondholders and accreditation bodies.

The fourth accountability issue facing colleges and universities is associated with whether an institution is a public or private institution. It is predicted that public institutions will face greater public scrutiny, thus, higher implicit accountability standards. The increased scrutiny faced by public institutions will increase the demand for internal audit services significantly. The prediction is operationalized by the following alternative-form research hypothesis:

H_6: The demand for the internal audit function in a college or university will be higher if the institution is a public college or university.

This construct is measured with PUB, a dichotomous variable with a one denoting a college or university that was a public institution, and a zero denoting a college or university that was private (Gordon et al. 1994; Koshal et al 1994; Mixon and Hsing 1994).

Effectiveness Factors of the Internal Audit Function

Management and directors rely on internal auditors to provide an objective assessment of the internal control systems of the organization. Their perception of the effectiveness of the internal audit function should impact management's demand for

the work of the internal audit function. If management and the directors perceive the internal audit function to be ineffective, they are less likely to demand services from the internal audit function. There is no previous research on how the demand for internal audit is affected by the effectiveness of the internal audit function. However, external audit studies have shown that the amount of reliance external auditors place on the internal auditor's work is determined by their evaluation of the effectiveness of the internal audit department (Abdel-Khalik et al. 1983; Margheim 1986).

Criteria for evaluating effectiveness of the internal audit department is defined by the Statement on Auditing Standards No. 65 (AICPA 1991) and the internal audit standards (IIA 1991). Montondon (1995) argues that although compliance with professional standards does not automatically increase effectiveness, the purpose of the standards is to provide guidance and structure that will enhance the value of the internal auditor. She says that all other factors being equal, compliance with professional standards regarding internal auditors should be viewed as increasing the effectiveness of the internal monitoring system.

There is little empirical research on the factors that managers use to assess the internal audit function. Traver (1991) studies the differences between management and the internal audit director's concept of internal audit effectiveness. The concept of effectiveness in his study relies on external audit standards established in SAS No. 65 (AICPA 1991), where effectiveness is defined as a function of auditor objectivity, auditor competence and auditor performance.

There is substantial research on the external auditor's reliance on the work of the internal audit function (Abdel-Khalik 1983; Brown 1983; Schneider 1984; Maletta and Kida 1993). The external auditor's criteria for evaluating internal auditors, in the absence of any other empirically developed measures, is considered the most valid criteria management might use to evaluate internal auditors. As suggested by previous external audit research (Brown 1983; Schneider 1984; Maletta and Kida 1993), it is expected that demand for internal audit would be based on the competence, objectivity, and work performance of the internal audit function.

Competence

Colbert (1993) contends that competence of internal auditors has to do with their technical ability to do quality work and is a measure of the quality of the staff. The higher the quality of the internal audit work and the internal audit staff, the greater likelihood of demand for their work. Evaluation of competence may be based on the professional experience and education of individual staff members. SAS 65 (1991) also lists professional certification as a factor to be considered when evaluating competence.

When evaluating competence of the internal audit staff, external auditors review knowledge and experience of the staff. Factors found to be significant in assessing competence include the nature and extent of the auditor's knowledge and experience. Studies find years of experience significant in measuring competence of the internal audit staff (Schneider 1984; Maletta and Kida 1993). Brown (1983) uses years

of experience and professional certifications as measures of internal audit competence and finds that competence is captured by the certification variable.

In the current study, it is predicted that a higher level of competence of the internal audit staff as measured by years of experience and certifications will significantly and positively affect the demand for internal audit services. The prediction is operationalized by the following alternative-form research hypothesis:

H_7: The demand for the internal audit function in an organization will increase as the competence of the internal audit function increases.

For this study, the construct competence is measured by the variable YEARS, average number of years of internal audit work experience that is held by the internal audit staff of the organization (Schneider 1984; Maletta and Kida 1993; Brown 1983). A second measure of competence is the variable CERT, which is a ratio of the number of internal auditors with professional accounting or auditing certification in each institution to the total number of internal auditors in the institution.

Objectivity

The importance of independence and objectivity for internal auditing is underscored by the fact that the first standard for the professional practice of internal auditing deals with this issue. That standard discusses two factors: organizational status and objectivity of the internal auditor. Objectivity is defined as an independent mental attitude, which should be maintained while performing audits (IIA 1991).

According to Colbert (1993), objectivity is the quality of being unbiased or neutral and relates to the ability of the internal audit staff to resist organizational pres-

sures to alter professional judgments. When assessing the objectivity of the internal auditors, the external auditors will consider factors relating to the organizational status of the internal audit function and the objectivity of the individual personnel. Generally, it is perceived that the higher the level in the organization that the internal audit director reports to, the greater the independence and objectivity (Brown 1983; Maletta and Kida 1993; Schneider 1984). Objectivity is measured by independence, captured by whether the internal audit department reports to an organization level high enough to assure independence of operations. As implied by SAS No. 65, organizational independence of the internal audit staff is a surrogate for its objectivity

One researcher (Bethea 1992) notes after studying a variety of organizational charts that where a function reports in an organization is directly correlated to the perceived importance of that function and/or how that organization views or values that function regarding its effectiveness. The reporting status is important because it formally expresses the value organizations assign the audit function by demonstrating the degree of freedom they are willing to give it.

Scarborough (1998) maintains that the status of the office to which the internal group reports will define the authority and the independence of the unit. The organizational status of the internal auditing function and the support accorded to it by the university administration largely determines its range and value. The status of internal auditing within an organization can have a significant impact on its effectiveness. Top executives believed that "greater independence of (internal audit) results from higher levels of reporting within the organization."

In Traver (1991), the organizational and reporting status of college and university auditors is used as a surrogate for independence of the auditors. The argument that a high level of independence is associated with high levels of organizational and reporting status for internal auditors is well supported in the internal audit literature (Manahan 1976; Sawyer 1988; Traver 1991). In his study, Traver (1991) finds that among the reporting hierarchies, the respondents perceived directly reporting to the audit committee to be the most important factor in attaining independence. Brown (1983) finds that independence is a primary factor used to evaluate the reliability of an internal audit function.

Schneider (1984), measures objectivity by the organizational level to which the internal audit department reports findings, with audit committee chairman ranked highest at four and assistant controller the lowest at one. In several studies, independence is measured by the organization level to which the internal audit department reported (Abdel-Khalik 1983; Maletta and Kida 1993; Ueker et al.1981), with highest level reporting to an independent audit committee, and lowest level reporting to the assistant controller.

Current internal and external auditing literature (Bethea 1992; Schneider 1984; Maletta and Kida 1993; Traver 1991) indicates that the administrative level to which the head of the internal audit staff reports is an important factor in assessing the independence of the internal audit function. The current study used the level to which the internal audit staff reported as a measure of their relative objectivity and independence with the highest ranking assigned to the audit committee. It was predicted that the in-

creasing independence of the internal audit staff within the organization would significantly and positively effect the demand for internal audit services. The prediction was operationalized by the following, alternative-form research hypothesis:

H_8: The demand for the internal audit function in an organization will increase as the perceived objectivity of the internal audit function increases.

This construct, objectivity, is measured using the variable, OBJ, with measurement similar to Schneider (1984), where the Audit committee or Board of Trustees is ranked as the highest reporting level at six and the category "other", which is comparable to the status of an assistant controller, is ranked lowest at one. The internal audit reporting levels and the related rankings assigned in this study are presented in Table 3.3.

Table 3.3

Values Assigned to the Objectivity Level Variable

Reporting Status	Value for OBJ Variable
Board of Trustees	6
President/Chancellor	5
Senior Vice President	4
Vice President	3
Controller	2
Other (e.g. assistant controller).	1

Work Performance

In addition to the level of competence and objectivity of the internal auditors, the external auditors are required to evaluate the quality and effectiveness of the work done by the internal auditors. In order to perform such an evaluation, the external auditor examines the scope of the internal audit work, the audit programs, the workpaper documentation, and evidence of adequate supervision and review of the work. The criteria utilized by the external auditors is similar to the criteria used by review teams when conducting a quality assurance review of the internal audit function in accordance with internal audit standards (IIA 1991).

Internal auditing is a specialized field with professional standards for performance. Generally, management lacks the background in auditing techniques and auditing standards that would enable them to assess the quality and effectiveness of the internal auditor's work in the same manner that the external auditor does. Quality assurance reviews are required by internal audit standards in order to assess internal audit compliance with standards. While these might be useful mechanisms for management to assess the quality of the internal audit function, management, generally, does not demand them. Studies show that less than a third of all internal audit departments surveyed have quality assurance reviews (Zeitlin and Nelson 1986).

Other criteria have been developed by the internal audit profession and management to measure the performance of the internal auditor (Albrecht et al. 1989; Rickard 1993). In these studies, meaningful recommendations are ranked as the best measure of performance of the internal audit function. Management would be more

likely to assess the quality and effectiveness of the internal auditor's work based on their perception of the value of the internal auditor's work. One might conclude that the more internal audit recommendations implemented by management the higher the value that management places on the work (recommendations) of the internal auditor, thus, the more effective management perceives internal audit to be.

In previous studies work performance is measured in a variety of ways. One study uses the percent of audits performed by internal audit in which scope is adequate and percent of audits in which workpapers are adequate (Schneider 1984). Other measures have included making good versus poor recommendations (Margheim 1986), acceptance of findings and implementation of recommendations (Traver 1991), comprehensiveness of the compliance procedures performed by the internal audit staff (Maletta and Kida 1993) and adequacy of workpapers, audit programs and reports (Schneider 1984).

In the current study, it is predicted that as the work performance of the internal audit staff increases, the demand for internal audit services will be significantly and positively affected. The prediction is operationalized by the following, alternative-form research hypothesis:

H_9: The demand for the internal audit function in an organization will increase as the perceived work performance of the internal audit function increases.

Similar to Margheim (1986) and Traver (1991), work performance of the internal audit function is based on management's perception of the value of the internal auditor's findings and recommendations. The construct work performance is measured

with the variable PERF, the percent of internal audit recommendations implemented by administration. This may not be the best measure of work performance. Internal auditors may recommend only changes or improvements that they are confident management will implement. However, this is the only measure of work performance that is available for the current study.

Summary

This chapter begins with a discussion of the growth of internal auditing in higher education. This discussion is followed by a description of the model developed in the current study. The constructs used in the model and the variables used as a surrogate measures for the constructs are explained. The research hypothesis for each variable is presented also.

CHAPTER IV

METHODOLOGY

This chapter summarizes the methodology employed in this study. The first section presents a description of the data used in this study. A detailed discussion of the statistical procedures selected for analyzing the data then follows. Finally, a discussion of the data analysis and results is presented.

Data Source

The proprietary data used in this study is provided by the Association of College and University Auditors (ACUA). The data was obtained from a survey of higher education audit departments sponsored by ACUA. The survey was conducted in order to quantify and assess the attributes and operating characteristics of audit functions in colleges and universities. To conduct this survey, ACUA retained the services of Industry Insights, Incorporated, an independent research and consulting firm headquartered in Columbus, Ohio. The research instrument used for the study was a six-page survey form (Appendix B) that was designed by ACUA, working in close conjunction with Industry Insights. Mailing of the forms to members took place in early May 1997, and completed forms were accepted until mid-June. All requested data related to the institution's fiscal year that ended in 1996. For most survey participants, the year

ended June 30, 1996, and responses reflect the status of their internal audit department as of that date.

The form was mailed to approximately 500 ACUA members, and a total of 301 completed forms were received in time for processing, representing a 60 percent response rate. Completed forms were returned directly to Industry Insights in postage-paid business reply envelopes. Of the 301 responses, nineteen were eliminated from this study because they were from universities operating outside the U. S., or they were from entities other than universities, such as state audit departments. This resulted in an initial sample of 282 institutions. Missing data points, as detailed in Table 4.5, result in the 242 cases used in the statistical analysis.

Additional data is obtained from the NCAA Membership Directory and the National Council of Education Statistic's Department of Education's Integrated Post-secondary Education Data System.

Quantifying the Variables

The Dependent Variable

The dependent variable STAFF, the internal audit staff size of each responding institution, is obtained from the ACUA survey. Respondents were asked to provide the number of professional internal audit staff, including contracted staff, as part of the survey instrument question number nine, and as demographic information on the a separate information sheet.

The Independent Variables

The variable STUD, the proxy for size of each college or university in the study, is measured by the academic year full-time equivalent enrollment reported on the ACUA survey database verification sheet. Some cases for the variable STUD appear to be small or large relative to the other STUD cases. As a check for coding errors, these questioned cases are validated by comparing the response on the ACUA survey instrument to the enrollment figure reported for selective institutions to enrollment reported on Integrated Postsecondary Education Data System (IPEDS) enrollment report. No coding errors were identified. The small STUD cases remain as data points in the study. The large observation is from an international university, which is not used in the current study. In order to check for possible coding errors, in addition to the questioned enrollment figures, every 30th observation for the STUD variable is validated by comparing the number reported on the ACUA survey to the enrollment figure reported on the IPEDS data.

The variable COMP, the measure for the construct Complexity, is measured using the Carnegie Classification. This information is obtained from the Carnegie Classifications published in the Chronicle of Higher Education. The categorical ranking is based on the level of complexity of the institution in accordance with the Carnegie Classification. The most complex rankings, according to the Carnegie Foundation, are the Research I institutions. They are given a ranking of ten. The least complex classification, professional schools and specialized institutions, is given a ranking of

one. The rankings, in descending order from most complex to least complex, and the frequencies of cases in each category are presented in Table 4.1.

Table 4.1

Carnegie Classification Values
and Number of Cases Per Level

Carnegie Classification Designation	Value for COMP variable	Number of Institutions
Research I	10	80
Research II	9	26
Doctoral I	8	22
Doctoral II	7	26
Masters I	6	85
Masters II	5	6
Bachelor I	4	3
Bachelor II	3	5
Community colleges	2	22
Professional and Specialized Schools	1	12

FED$, the variable used in the model for the construct Federally sponsored programs of each institution, is measured by the total federal dollars received by the institution. The amount of federal dollars received is obtained from the Integrated Postsecondary Education Data System (IPEDS) Current Funds Revenue Report, recorded as current restricted Federal contracts and grants revenue. IPEDS is a single, comprehensive system managed by the United States Department of Education's National Council on Education Statistics, that encompasses all identified institutions, whose

primary purpose is to provide information on postsecondary education. Data are collected from approximately 11,000 postsecondary institutions. IPEDS data has been used extensively in higher education research (Schipper 1985; Spruill 1989; Gordon et al. 1997).

The variable used to measure the construct for athletic program accountability, NCAA, is obtained from the NCAA 1996 Membership Directory. The Directory lists all NCAA member schools and the division classification of each school. The construct is measured with NCAA, a categorical variable ranking NCAA athletic participation, where four equals Division IA, three equals Division IAA, two equals Division II and one equal Division III, and a zero is assigned to institutions in the study that do not have NCAA membership. The rankings and number of cases per ranking are as follows:

Table 4.2

NCAA Membership Level Values and Number of Cases Per Level

NCAA Division Level	Value for NCAA Variable	Number of Institutions
Division IA	4	74
Division IAA	3	93
Division II	2	43
Division III	1	27
Nonmember	0	48

The variable MED is a dummy variable used to identify institutions with a medical education program. This variable is a dichotomous variable where a one denotes a university that has a medical education program, and a zero denotes a college or university without a medical education program. The data for this variable comes from question 38 on the ACUA survey instrument, which asks the respondents if they have a medical education program. In the current study, there are 65 institutions with medical education programs and 217 institutions without medical education programs.

The variable PUB is a dummy variable used to identify public institutions. This variable is a dichotomous variable where a one denotes a public university and a zero denotes a private university. The data from this variable comes from the demographic information reported on the information sheet submitted with the ACUA survey. In the current study, there are 221 public institutions and 60 private institutions.

The variable objectivity, OBJ, is measured by taking the responses to question number three from the ACUA survey instrument. The question asks, "to whom does the audit function *principally* report?" The respondents are given six choices ranging from Board of Trustees to other. Some of the "other" category responses actually fit into one of the other five categories, and are so assigned by Industry Insights. The raw responses for the "other" category are obtained and analyzed. The responses remaining in the "other" category are assistant controller or comparable positions. The level of reporting for each institution is ranked from one to six. The rankings and number of cases per ranking are as follows:

Table 4.3

Objectivity Level Values and Number of Cases Per Level

Reporting Status	Value for OBJ Variable	Number of Institutions
Board of Trustees	6	63
President/Chancellor	5	100
Senior Vice President	4	45
Vice President	3	54
Controller	2	2
Other	1	22

CERT, the variable for the construct competence, is measured with the ratio of internal auditors with professional certifications to total internal auditors per institution. The number of internal auditors with professional accounting and/or auditing certifications and the total number of internal auditors are taken from questions 14, 18 and 23 of the ACUA survey instrument. Question 14 relates to the chief audit executive of the organization, and ask if the individual has professional certifications. Question 18 relates to audit managers, and asks how many audit managers on each organization's staff have certification and how many audit managers are on the institution's staff. Question 23 is similar to question 18, except the questions relate to number of staff internal auditors with certifications and total number of staff internal auditors per institution. The total number of auditors with certifications per institution are divided by the total number of auditors per institution to arrive at the ratio used in the study.

A second measure of competence is years of service of the audit staff, YEARS. YEARS is measured by the average number of years of internal audit work experience that is held by the internal audit staff of the organization. The variable measurement is calculated from data taken from the ACUA survey, questions 16, 20, 21, 25 and 26. Questions 16, 21 and 26 asks for the average number of years internal audit and public accounting experience for each professional position level—chief audit executive, audit manager, and staff auditor. Questions 20 and 25 asks for the total number of audit managers and staff auditors. The total number of auditors for each position level is multiplied by average years of audit and accounting experience for each level. The product of these three calculations is summed and divided by the total professional internal audit staff to arrive at the average years experience for the entire staff.

The variable work performance, PERF, was obtained from the ACUA survey instrument, question number 31, which asked, "What was the percentage of audit recommendations implemented during FY 1996?"

The Descriptive Model

The model for estimating the effect of each of the variables on the demand for internal audit in higher education is summarized in the following equation:

$$STAFF = \beta_0 + \beta_1 STUD + \beta_2 COMP + \beta_3 FED\$ + \beta_4 NCAA + \beta_5 MED + \beta_6 PUB + \beta_7 OBJ + \beta_8 CERT + \beta_9 PERF \quad (1)$$

The model constructs and the alternative hypothesis for each construct are summarized in table 4.4. Also included in the table are the names and measurements of the variables used as proxies for the constructs and the sign of the predicted relationship between the predictor variables and the dependent variable.

Table 4.4

Constructs, Hypotheses, Variables and Predicted Signs

CONSTRUCT	H_x	VARIABLES	NAME	PRED. SIGN
		Dependent Variable		
Demand for internal audit		Number of FTE internal audit staff	STAFF	
		Independent Variables		
Organization Characteristics:				
Size of the organization	H_1	Number of full-time equivalent students	STUD	+
Complexity of the Organization	H_2	Ranking according to the Carnegie Classifications	COMP	+
Accountability Issues:				
Federal government oversight of federal support	H_3	Federally dollars received for student financial aid and research	FED$	+
NCAA oversight over member institutions	H_4	Ranking according to NCAA membership level	NCAA	+
Oversight of medical education programs	H_5	Existence of a Medical education program	MED	+
Legislative and public oversight of Public institutions	H_6	Institution is private or public	PUB	+
Effectiveness of Internal Audit Staff:				
Objectivity of the internal audit staff	H_7	Reporting status of the internal audit staff	OBJ	+
Competency of the internal audit staff	H_8	Ratio of internal auditors with certifications to total internal auditors *and* average number of years of experience of the internal audit staff	CERT and YEARS	+
Work performance of the internal audit staff	H_9	Percent of audit recommendations implemented	PERF	+

Natural Log of Staff Model

Internal audit staffs tend to be small (Flesher 1996). Therefore, the dependent variable, STAFF is positively skewed. This fact could result in the OLS model predicting an unrealistic demand for a negative number of internal auditors (STAFF). A second model is tested, with the natural log of STAFF as the dependent variable. The second model is summarized in the following equation:

$$\ln STAFF = \beta_0 + \beta_1 STUD + \beta_2 COMP + \beta_3 FED\$ + \beta_4 NCAA + \beta_5 MED + \beta_6 PUB + \beta_7 OBJ + \beta_8 CERT + \beta_9 PERF \quad (2)$$

Statistical Techniques

Ordinary Least Squares Regression (OLS) is used to estimate the models. Regression analysis is a general statistical technique used to analyze relationships between a single dependent variable and several independent variables. Multiple regression analysis provides a means of assessing the predictive power of the independent variables selected for the model.

Assumptions Underlying OLS Regression Analysis

There are several assumptions underlying OLS that should be satisfied. (Hair et al. 1995). Each of these assumptions is examined in the current study. The assumptions underlying OLS are:

1. The error terms have equal variances, that is, they are homoscedastic.
2. The error terms are uncorrelated.
3. The error terms are normally distributed with a mean equal to zero.

4. The variables have a linear relationship.

5. The predictor variables are independent.

Results of the diagnostics are discussed in the following section of the current study. Remedies for violations of the assumptions are discussed in the Data Analysis and Results section of the current study.

Homoscedasticity

Homoscedasticity assumes equal variances of the error terms (Hair et al. 1995). In order to test for homoscedasticity, the predicted dependent variable is plotted against the independent variables, seeking a random scatter. Another test used to test for heteroscedasticity (unequal variances) is the White's Chi-square test. The null hypothesis for the White test is the data is homoscedasticity. In the current study, the White's test is used. The null hypothesis is rejected at alpha level .05 level ($\chi^2 = 72.10$, $p < 0.033$), indicating the presence of heteroscedasticity.

Linearity

The concept of correlation is based on a linear relationship. The linear relationship is critical to regression analysis. Plots of the residuals against the predicted values, or the independent variables, are used to test the assumption of linearity. The plot should form a random scatter about the zero slope. If the plots indicate a problem, the corrective action is a transformation of the data. A review of the data indicates that the relationship between the residuals and the independent variables is linear, with the exception of OBJ and NCAA.

Multivariate Normality of the Independent Variables

Multivariate normality means that the individual variables are normal in a univariate sense and their combinations are normal. If a variable is multivariate normal, it is also univariate normal. However, the reverse is not necessarily true. Thus a situation in which all variables exhibit univariate normality will help gain multivariate normality, although not guarantee it.

If the data in the model are not from a normal distribution, then the t-tests are suspect, and the R^2 will be skewed. Non-normality of the data can be detected by examining the Shapiro-Wilks test that gives a w-statistic and a p-value. The null hypothesis is the data is from a normal distribution. The Shapiro-Wilks test statistic of the residuals is used in the current study to test for normality and the null hypothesis is rejected, which indicates the data is not normally distributed ($p < 0.001$).

Independent Error Terms

Regression assumes that the error terms are not correlated. If the error terms are correlated, this may be an indication of omitted systematic relationship (independent variables(s) are unaccounted for in the data). A plot of residuals against the independent variables, or residuals against residuals is used to identify correlated error terms. Residuals against the independent variables give a graphical representation of the relationship between the dependent variable and a single independent variable. The plots indicate that the error terms are not correlated.

Independence of the Predictor Variables

A key assumption of regression analysis is the assumption of independence of the predictor variables. Multicollinearity refers to the correlation among three or more independent variables. This is a data problem, not a problem of model specification. However, it has substantial effects on the results of the regression procedure. The diagnosis and correction of multicollinearity in this study is discussed in detail in the Data Analysis and Results section of this chapter.

Outliers

Outliers are cases with a unique combination of characteristics identifiable as distinctly different from the other cases (Hair et al. 1995). Outliers are cases in the data set that are outlying or extreme. They can be due to a procedural error, extraordinary events with or without an explanation of their occurrence, or cases that fall within the ordinary range of values on each of the variables but are unique in their combination of values across the variables (Hair et al. 1995). It is important to study theses outlying cases carefully and decide whether they should be retained or eliminated. This study uses two procedures for identifying outliers. First, leverage points, which give the distance of one observation from the others, are identified. An R-student greater than two, which means the observation is more than two standard deviations from the mean, indicates a leverage point (Hair et al. 1995). Also, a Hat Matrix greater than 2(k/n) indicates a value large enough to warrant attention (Belsley et al. 1980).

The second procedure determines which leverage points are also influential cases. Influential cases exert a significant impact on the estimates. The diagnostic tools used for identifying influential cases in the current study are the DF Betas, the COV Ratio, and DF Fits. According to Belsley et al. (1980) an observation with |DF Beta| greater than $2/\sqrt{n}$ may indicate an influential observation. The size adjusted cut-off for DF Fits will be $2^* \sqrt{(k/n)}$, and for the COV ratio, |COV ratio-1| near to or greater than 3k/n (Belsley et al. 1980).

In the current study, several cases are identified as leverage points and influential cases, indicating outliers. These cases are probably related to the variable for size (STUD). As noted by Fama and Jensen (1983), some research universities, though small in size, are very complex. These universities may be identified as influential cases because of the small size of the institution relative to the dependent variable, number of internal auditors. Also, some medical schools are identified as outliers, possibly because the internal audit staff size is large relative to several of the independent variables including the existence of an athletic program and number of students. Once the influential cases are identified, profiled, and categorized, a decision is made relative to the deletion or retention of each one. An observation is deleted only if it can be shown to be uncorrectably in error (Belsley et al. 1980). Based on the analysis performed, no cases identified as outliers are deleted.

Data Analysis and Results

Descriptive Statistics

Summary descriptive statistics for the dependent variable, STAFF, and the independent variables used in the regression models analyzed in this study are presented in Table 4.5 on page 78 and 79. Table 4.5 presents the descriptive statistics for the initial sample, which totals 282 cases. Also, Table 4.5 contains the descriptive statistics for the sample used in the analysis, which does not include cases with missing data points, totaling 242 cases. In their original form, several of the continuous variables are characterized by high skewness. According to Hair et al. (1995), skewness falling outside the range of −1 to +1 indicates a substantially skewed distribution. According to this criteria, several of the continuous variables in Table 4.5, including STAFF, STUD and FED$, are highly skewed. These departures from normality and the associated remedies are discussed in greater detail in the Data Analysis and Results section of this study.

Results of the Cross-Sectional Tests, Model 1

Ordinary Least Squares Regression (OLS) is used to estimate the models. The results for Model 1 are shown in Table 4.6, page 80. The significance of the model is tested using the analysis of the variance procedure, where the null hypothesis is none of the independent variables make a difference. The parameter estimates, t-statistics and p-values for each of the independent variables are used to test the alternative hypotheses. Model 1 is significant with an F value of 54.35 ($p < 0.000$) and an adjusted R^2 of

Table 4.5

Descriptive Statistics of the Dependent Variable, STAFF, and Explanatory Variables

Variable	Number*	Mean	Mode	Median	Standard Deviation	Minimum	Maximum	Skewness
STAFF	282	4.13	1.00	2.00	3.96	1.00	21.00	1.64
	242	*4.11*	*1.00*	*2.00*	*3.93*	*1.00*	*21.00*	*1.69*
STUD (thousands)	281	17.79	11.00	11.00	24.49	0.43	245.92	5.18
	242	*17.54*	*11.00*	*11.00*	*24.41*	*0.43*	*245.92*	*5.43*
COMP	282	6.09	6.00	7.00	2.68	1.00	10.00	-0.63
	242	*6.95*	*6.00*	*7.00*	*2.71*	*1.00*	*10.00*	*-0.65*
FED$ (millions)	281	54.14	69.43	19.61	80.67	0.33	569.48	2.77
	242	*54.91*	*69.43*	*20.99*	*82.68*	*0.33*	*569.47*	*2.84*
NCAA	282	2.37	3.00	3.00	1.41	0.00	4.00	-0.53
	242	*2.41*	*3.00*	*3.00*	*1.40*	*0.00*	*4.00*	*-0.57*

Note: STAFF = number of internal audit staff; STUD = size of the institution;
COMP = complexity of the institution; FED$ = government oversight of federal support dollars;
NCAA = NCAA oversight over member institutions.

* Data set of 282 cases with missing data points, the sample size used for data analysis includes 242 cases.

Table 4.5 (continued)

Descriptive Statistics of the Dependent Variable, STAFF, and Explanatory Variables

Variable	Number*	Mean	Mode	Median	Standard Deviation	Minimum	Maximum	Skewness
MED	282	0.23	0.00	0.00	0.42	0.00	1.00	1.29
	242	*0.24*	*0.00*	*0.00*	*0.43*	*0.00*	*1.00*	*1.17*
PUB	282	0.78	1.00	1.00	0.41	0.00	1.00	-1.38
	242	*0.76*	*1.00*	*1.00*	*0.43*	*0.00*	*1.00*	*-1.25*
OBJ	265	4.36	5.00	5.00	1.42	1.00	6.00	-0.84
	242	*4.43*	*5.00*	*5.00*	*1.39*	*1.00*	*6.00*	*-0.86*
CERT (%)	260	66.55	100.00	75.00	35.48	0.00	100.00	-0.72
	242	*68.24*	*100.00*	*75.50*	*34.91*	*0.00*	*100.00*	*-0.79*
YEARS	255	10.46	5.00	10.00	6.07	0.00	42.00	1.17
	242	*10.46*	*5.00*	*10.00*	*6.07*	*0.00*	*42.00*	*1.17*
PERF (%)	246	79.72	80.00	80.00	19.33	0.00	100.00	1.97
	242	*80.00*	*80.00*	*80.00*	*19.01*	*0.00*	*100.00*	*-2.02*

Note: MED = oversight of medical education programs; PUB = state legislative and public oversight of institutions; OBJ = objectivity of the internal audit function; CERT and YEARS = competency of the internal audit staff; PERF = work performance of the internal audit staff.

* Data set of 282 cases with missing data points, the sample size used for data analysis includes 242 cases.

Table 4.6

Estimated Coefficients for the Cross-Sectional Regression Model 1 Testing $H_1, H_2, H_3, H_4, H_5, H_6, H_7, H_8, H_9$ with Variable CERT Measuring Competency

$$STAFF = \beta_0 + \beta_1 STUD + \beta_2 COMP + \beta_3 FED\$ + \beta_4 NCAA + \beta_5 MED + \beta_6 PUB + \beta_7 OBJ + \beta_8 CERT + \beta_9 PERF$$

Statistics	Intercept	STUD (thousands)	COMP	FED$ (millions)	NCAA	MED	PUB	OBJ	CERT (%)	PERF (%)
Coeff.	-1.622	0.029	0.337	0.016	-0.035	3.358	0.499	0.111	-0.001	0.005
Std. Err.	0.875	0.007	0.085	0.002	0.146	0.389	0.376	0.110	0.004	0.008
t-value	-1.854	4.291	3.961	7.369	-0.239	8.617	1.329	1.009	-0.203	0.635
p-value	0.032	0.000	0.000	0.000	0.595	0.000	0.093	0.157	0.580	0.263

Adjusted R^2	66.58%
F value	54.35
Probability	0.00

Note: STAFF = number of internal audit staff;
STUD = size of the institution;
COMP = complexity of the institution;
FED$ = government oversight of federal support dollars;
NCAA = NCAA oversight over member institutions;
MED = oversight of medical education programs;
PUB = state legislative and public oversight of institutions;
OBJ = objectivity of the internal audit function;
CERT and YEARS = competency of the internal audit staff;
PERF = work performance of the internal audit staff.

66.58%. The results for Model 1 support hypotheses H_1, H_2, H_3 and H_5. Table 4.6 shows that the organizational characteristics size (STUD) and complexity (COMP), and the accountability issues resulting from having a medical education program (MED) and receiving federal support dollars (FED$) are positive and highly significant ($p< 0.000$) determinants of internal audit demand.

Table 4.6 shows that internal auditor effectiveness variables measuring the constructs for objectivity, competence and work performance (OBJ, CERT, PERF) do not have statistically significant effects on internal audit demand. Also, accountability issues related to NCAA membership (NCAA) and oversight public institutions receive from legislators and taxpayers (PUB) do not have statistically significant effects on internal audit demand. Coefficients for the internal auditor competence variable (CERT) and the NCAA membership variable (NCAA) are negative, which is contrary to the predicted direction and may be an indication of multicollinearity.

The results for the NCAA variable are particularly surprising considering the audit and accountability implications of major athletic programs. NCAA and COMP are highly correlated with a correlation coefficient of .67, which may be a source of some of the multicollinearity in the model. When Model 1 is estimated without COMP, NCAA is highly significant with a t-value of 2.945 ($p < 0.001$).

An estimation of Model 1 was also made with an alternative measure of internal auditor competence, years of service (YEARS). The results are presented in Table 4.7, page 83. The model is highly significant ($p<0.000$) with an adjusted R^2 of 66.66%,

Table 4.7

Estimated Coefficients for the Cross-Sectional Regression Model 1 Testing $H_1, H_2, H_3, H_4, H_5, H_6, H_7, H_8, H_9$ with Variable YEARS Measuring Competency

$$STAFF = \beta_0 + \beta_1 STUD + \beta_2 COMP + \beta_3 FED\$ + \beta_4 NCAA + \beta_5 MED + \beta_6 PUB + \beta_7 OBJ + \beta_8 YEARS + \beta_9 PERF$$

Statistics	Intercept	STUD (thousands)	COMP	FED$ (millions)	NCAA	MED	PUB	OBJ	YEARS	PERF (%)
Coeff.	-1.491	0.030	0.340	0.016	-0.041	3.366	0.495	0.105	-0.019	0.005
Std. Err.	0.869	0.007	0.085	0.002	0.145	0.389	0.376	0.110	0.025	0.008
t-value	-1.718	4.377	4.002	7.349	-0.284	8.650	1.316	0.961	-0.760	0.666
p-value	0.043	0.000	0.000	0.000	0.612	0.000	0.095	0.169	0.776	0.253

Adjusted R^2	66.66%
F value	54.54
Probability	0.00

Note: STAFF = number of internal audit staff;
COMP = complexity of the institution;
NCAA = NCAA oversight over member institutions;
PUB = state legislative and public oversight of institutions;
CERT and YEARS = competency of the internal audit staff;
STUD = size of the institution;
FED$ = government oversight of federal support dollars;
MED = oversight of medical education programs;
OBJ = objectivity of the internal audit function;
PERF = work performance of the internal audit staff.

which is nearly identical to the estimation of Model 1 using the variable CERT as the measure of competence. The variable, YEARS, is not significant and does not have the predicted sign. The significance of the other variables in the model does not differ from the results in the first estimation of Model 1, with CERT as the measure of competence.

Model 2

As indicated in the descriptive statistics presented in Table 4.5, the dependent variable is positively skewed, indicating a problem with meeting the assumption of a normal distribution. As a result the t-tests may be suspect and the R^2 may be skewed. Also, Model 1 predicts an unrealistic demand for a negative number of internal auditors (STAFF) in three predictions. In addition to the lack of normality in the data, the White's Chi Square statistic indicates heteroscedasticity. Data transformations provide the principal means of correcting non-normality and heteroscedasticity (Hair et al. 1995).

Table 4.8, on page 85, reports the results for the estimation of Model 2. Model 2 results are similar to Model 1, with the exception of the variable for accountability issues faced by public institutions (PUB). In model 2, this variable is statistically significant ($p< 0.038$). However, taking the log of the dependent variable did not improve the normality distribution of the residuals or correct for heteroscedasticity.

According to Table 4.5, the continuous variables for the construct size (STUD) and federal support (FED$) are positively skewed also. Model 2 is estimated using the

Table 4.8

Estimated Coefficients for the Cross-Sectional Regression Model 2 Testing $H_1, H_2, H_3, H_4, H_5, H_6, H_7, H_8, H_9$ Using lnSTAFF as the Dependent Variable

$$\ln STAFF = \beta_0 + \beta_1 STUD + \beta_2 COMP + \beta_3 FED\$ + \beta_4 NCAA + \beta_5 MED + \beta_6 PUB + \beta_7 OBJ + \beta_8 CERT + \beta_9 PERF$$

Statistics	Intercept	STUD (thousands)	COMP	FED$ (millions)	NCAA	MED	PUB	OBJ	CERT (%)	PERF (%)
Coeff.	-0.599	0.005	0.100	0.003	0.006	0.764	0.146	0.030	0.000	0.001
Std. Err.	0.190	0.001	0.018	0.000	0.032	0.085	0.082	0.024	0.000	0.001
t-value	-3.125	3.800	5.402	6.484	0.217	8.942	1.775	1.247	0.337	1.135
p-value	0.001	0.000	0.000	0.000	0.414	0.000	0.038	0.106	0.363	0.128

Adjusted R^2	68.94%
F value	60.91
Probability	0.00

Note: STAFF = number of internal audit staff; STUD = size of the institution;
COMP = complexity of the institution; FED$ = government oversight of federal support dollars;
NCAA = NCAA oversight over member institutions; MED = oversight of medical education programs;
PUB = state legislative and public oversight of institutions; OBJ = objectivity of the internal audit function;
CERT and YEARS = competency of the internal audit staff; PERF = work performance of the internal audit staff.

natural log of FED$ and the natural log of STUD. The results are presented in Table 4.9, page 87. The model has an adjusted R^2 of 69.69% and is statistically significant ($p<0.000$). The only noticeable changes in the results are the t-statistic and p-value for PUB, which is no longer significant ($p<0.221$). However, the Shapiro-Wilks test for normality fails to reject H_0 ($p<0.219$), indicating that the transformed data is from a normal distribution. Also, the White's Chi-square test for heteroscedasticity fails to reject H_0 with the $\chi^2 = 63.10$ ($p<0.134$), which indicates that the transformed data is homoscedastic.

Fixed Effects of Categorical Variables

Three categorical variables, proxies for levels of complexity of the organization (COMP), levels of reporting status of the internal audit function (OBJ) and levels of membership in the National Collegiate Athletic Association (NCAA), are included in Model 1 as continuous variables. The assumption in Model 1 is that there is a linear relationship between COMP, OBJ, NCAA and the number of auditors, STAFF. Potential limitations of these assumptions are that (1) the relationship may not be linear, and (2) the rank order specified for each variable may not hold, that is, Research I universities may not be the most complex and professional schools may not be the least complex.

These assumptions are relaxed in Models 3, 4, and 5. In each of these models, the continuous variable is replaced with categorical (dummy) variable in a fixed effects model. Model 3 replaces the one-sided test of H_2, more complex organizations will

Table 4.8

Estimated Coefficients for the Cross-Sectional Regression Model 2 Testing $H_1, H_2, H_3, H_4, H_5, H_6, H_7, H_8, H_9$ Using lnSTAFF as the Dependent Variable

$$\ln STAFF = \beta_0 + \beta_1 STUD + \beta_2 COMP + \beta_3 FED\$ + \beta_4 NCAA + \beta_5 MED + \beta_6 PUB + \beta_7 OBJ + \beta_8 CERT + \beta_9 PERF$$

Statistics	Intercept	STUD (thousands)	COMP	FED$ (millions)	NCAA	MED	PUB	OBJ	CERT (%)	PERF (%)
Coeff.	-0.599	0.005	0.100	0.003	0.006	0.764	0.146	0.030	0.000	0.001
Std. Err.	0.190	0.001	0.018	0.000	0.032	0.085	0.082	0.024	0.000	0.001
t-value	-3.125	3.800	5.402	6.484	0.217	8.942	1.775	1.247	0.337	1.135
p-value	0.001	0.000	0.000	0.000	0.414	0.000	0.038	0.106	0.363	0.128

Adjusted R^2	68.94%
F value	60.91
Probability	0.00

Note: STAFF = number of internal audit staff; STUD = size of the institution;
COMP = complexity of the institution; FED$ = government oversight of federal support dollars;
NCAA = NCAA oversight over member institutions; MED = oversight of medical education programs;
PUB = state legislative and public oversight of institutions; OBJ = objectivity of the internal audit function;
CERT and YEARS = competency of the internal audit staff; PERF = work performance of the internal audit staff.

have more internal auditors with the two-sided null hypothesis H_{2N} that the complexity category has no effect on the number of internal auditors. This fixed effects model allows for the potential reordering of the complexity levels, and the possibility that the effects of the complexity levels are not linear, that is, there could be a significant difference between a complexity level ten and complexity level nine, but not a significant difference between a complexity level two and a complexity level one.

Model 4 replaces the one-sided test of H_4, institutions with upper level membership in the NCAA organizations will have more internal auditors, with the two-sided null hypothesis H_{4N} that the NCAA category has no effect on the number of internal auditors. Models 5 replaces the one-sided test of H_7, as the reporting level for the internal auditor increases the number of internal auditors increases, with the two-sided null hypothesis H_{7N} that the objectivity category has no effect on the number of internal auditors.

For each of the models, the hypothesis that the constant terms are all equal is tested with a F-test. The restricted model in all cases is Model 1 and the full model for each hypothesis test is presented below:

$$\begin{aligned} STAFF = {} & \beta_0 + \beta_1 STUD + \beta_{29} D_9 + \beta_{28} D_8 + \beta_{27} D_7 + \beta_{26} D_6 + \beta_{25} D_5 + \beta_{24} D_4 + \beta_{23} D_3 \\ & + \beta_{22} D_2 + \beta_{21} D_1 + \beta_3 FED\$ + \beta_4 NCAA + \beta_5 MED + \beta_6 PUB + \beta_7 OBJ + \\ & \beta_8 CERT \beta_9 PERF \end{aligned} \quad (3)$$

$$\begin{aligned} STAFF = {} & \beta_0 + \beta_1 STUD + \beta_2 COMP + \beta_3 FED\$ + \beta_{43} D_3 + \beta_{42} D_2 + \beta_{41} D_1 + \beta_{40} D_0 + \\ & \beta_5 MED + \beta_6 PUB + \beta_7 OBJ + \beta_8 CERT + \beta_9 PERF \end{aligned} \quad (4)$$

$$STAFF = \beta_0 + \beta_1 STUD + \beta_2 COMP + \beta_3 FED\$ + \beta_4 NCAA + \beta_5 MED + \beta_6 PUB + \beta_{75} D_5 + \beta_{74} D_4 + \beta_{73} D_3 + \beta_{72} D_2 + \beta_{71} D_1 + \beta_8 CERT + \beta_9 PERF \quad (5)$$

Under the null hypothesis, the efficient estimator is pooled least squares. The hypothesis that the constant terms are equal is tested with the F-test. The F-ratio used is $F(n-1, n-k) = [(R_u^2 - R_r^2)/ n-1] \div [(1 - R_u^2)/n-k]$, where u indicates the unrestricted model and r indicates the restricted model with only a single constant term (Greene 1993).

The results of the F-test for Model 3 show a calculated F of .43. The critical value of the F-distribution is 1.88 at the .05 alpha level ($p<0.918$). The hypothesis that the constant terms are equal is not rejected. Prior results indicated that COMP did have a linear relationship with the predicted variable. The t-statistics and p-values for Model 3 are presented in Panel A of Table 4.10, page 91. The results for Model 3 indicate that, with the exception of complexity level nine and level eight (Research II and Doctoral I institutions), each complexity level is significantly different from level 10 (Research I institutions). Generally, the parameter estimates indicates that the rank order specified for each complexity level variable holds as the analysis moves from the most complex to the least complex ranking. The one exception is COMPVI (Master I institutions).

The results of the F-test for Model 4 for the NCAA categorical variable show a calculated F of 1.15. The critical value of the F-distribution is 2.37 at the .05 alpha level ($p<0.332$). The hypothesis that the constant terms are equal for Model 1 and

Model 5 is not rejected. The t-statistics and p-values for Model 4 are presented in Panel B of Table 4.10, page 93. The intercept is significant. The other NCAA dummy variables are not significant at the .05 level, indicating that the differences between the levels are not significant. The results may not be meaningful because of the high correlation between NCAA and COMP.

The results of the F-test for Model 5 show a calculated F of 2.25. The critical value of the F-distribution table is 2.21 ($p<0.049$). The hypothesis that the constant terms for Model 1 and Model 5 are equal is rejected at the .05 alpha level. The t-statistics and p-values for Model 5 are presented in Panel C of Table 4.10, page 94. All levels of objectivity are significant with the exception of objectivity level one.

OLS assumption diagnostics indicated that objectivity does not have a linear relationship with the predicted variable. An examination of the parameter estimates provides some insight into the results. The rank order specified did not hold. Objectivity level II, where the internal audit function reports to the controller, increases greatly from level III (reporting to the Vice President level), from –1.156 to –4.483. However, the parameter estimate for level I, the lowest reporting level, is a positive 0.023. This is the only positive estimate for the objectivity rankings and might be interpreted as an indication that reporting to the "other" category will result in greater demand for internal auditors than reporting to the Board, which is the highest reporting level. Objectivity level one is the category designated as the "other" category on the ACUA survey. This category encompasses reporting relationships that do not appropriately fit into one

of the other categories. The "other" category may have cases that appropriately belong in one of the other objectivity level categories.

Table 4.10

Estimated Coefficients from the Fixed Effects Models Testing H_{2N}, H_{4N}, and H_{7N}

Panel A: Model 3, Includes Dummy Variables for Levels of the COMP Variable

Variables	Coeff.	Std . Err.	t-value	p-value
Intercept	1.741	1.019	1.708	0.044
STUD (thousands)	0.027	0.007	3.846	0.000
COMPIX	-0.699	0.643	-1.087	0.278
COMPVIII	-0.965	0.673	-1.433	0.153
COMPVII	-1.245	0.668	-1.863	0.063
COMPVI	-2.190	0.570	-3.841	0.000
COMPV	-2.019	1.185	-1.704	0.089
COMPIV	-2.156	1.297	-1.663	0.097
COMPIII	-2.283	1.442	-1.583	0.114
COMPII	-2.283	0.855	-2.668	0.008
COMPI	-2.596	0.952	-2.726	0.006
FED$ (millions)	0.014	0.002	6.107	0.000
NCAA	0.093	0.157	0.593	0.276
MED	3.113	0.445	6.985	0.000
PUB	0.502	0.389	1.291	0.099
OBJ	0.120	0.113	1.062	0.144
CERT (%)	-0.001	0.004	-0.416	0.663
PERF (%)	0.007	0.008	0.850	0.198

Restricted Model		Unrestricted Model	
Adjusted R^2	68.09%	Adjusted R^2	65.99%
F value	40.55	F value	28.51
p-value	0.00	p-value	0.00

$F = 0.43$

F distribution = 1.88 ($\alpha = .05$, $df_1 = 9$, $df_2 = 224$)

Probability < 0.91

Note: STAFF = number of internal audit staff; STUD = size of the institution; COMPIX = Research II institutions; COMPVIII = Doctoral I institutions; COMPVII = Doctoral II institutions; COMPVI = Masters I institutions; COMPV = Master II institutions; COMPIV = Bachelors I institutions; COMPIII = Bachelors II institutions; COMPII = Associates degree institutions; COMPI = Specialized schools; FED$ = government oversight of federal support dollars; NCAA = NCAA oversight over member institutions; MED = oversight of medical education programs; PUB = state legislative and public oversight of institutions; OBJ = objectivity of the internal audit function; CERT and YEARS = competency of the internal audit staff; PERF = work performance of the internal audit staff.

Table 4.10 (continued)

Estimated Coefficients from the Fixed Effects Models Testing H_{2N}, H_{4N} and H_{7N}

Panel B: Model 4, includes dummy variables for levels of the NCAA Variable

Variables	Coeff.	Std . Err.	t-value	p-value
Intercept	-2.276	1.185	-1.922	0.027
STUD (thousands)	0.027	0.006	3.953	0.000
COMP	0.447	0.094	4.724	0.000
FED$ (millions)	0.015	0.002	7.053	0.000
NCAAIII	0.018	0.423	0.043	0.966
NCAAII	-0.522	0.545	-0.959	0.338
NCAAI	-0.684	0.592	-1.155	0.249
NCAAO	1.006	0.704	1.428	0.154
MED	3.149	0.393	8.000	0.000
PUB	0.393	0.382	1.031	0.146
OBJ	0.115	0.109	1.055	0.150
CERT (%)	-0.001	0.004	-0.458	0.672
PERF (%)	0.005	0.007	0.674	0.247

Restricted Model		Unrestricted Model	
Adjusted R^2	68.09%	Adjusted R^2	67.24%
F value	40.55	F value	42.22
p-value	0.00	p-value	0.00

F = 1.15
F distribution = 2.37 ($\alpha = .05$, $df_1 = 4$, $df_2 = 229$)
Probability < 0.33

Note: STAFF = number of internal audit staff; STUD = size of the institution; COMP = complexity of the institution; FED$ = government oversight of federal support dollars; NCAAIII= NCAA Division IAA institutions; NCAAII= NCAA Division II institutions; NCAAI= NCAA Division III institutions; NCAAO = institutions without NCAA membership; MED = oversight of medical education programs; PUB = state legislative and public oversight of institutions; OBJ = objectivity of the internal audit function; CERT and YEARS = competency of the internal audit staff; PERF = work performance of the internal audit staff.

Table 4.10 (continued)

Estimated Coefficients from the Fixed Effects Models Testing H_{2N}, H_{4N} and H_{7N}.

Panel C: Model 5, Includes Dummy Variables for Levels of the OBJ Variable

Variables	Coeff.	Std . Err.	t-value	p-value
Intercept	-0.179	0.897	-0.201	0.841
STUD (thousands)	0.027	0.006	4.104	0.000
COMP	0.334	0.083	4.012	0.000
FED$ (millions)	0.016	0.002	7.663	0.000
NCAA	-0.001	0.143	-0.005	0.502
MED	3.255	0.386	8.433	0.000
PUB	0.575	0.385	1.493	0.065
OBJV	-1.140	0.395	-2.885	0.004
OBJIV	-1.233	0.491	-2.508	0.012
OBJIII	-1.177	0.460	-2.561	0.011
OBJII	-4.491	2.275	-1.974	0.049
OBJI	0.014	0.662	0.022	0.982
CERT (%)	-0.002	0.004	-0.546	0.708
PERF (%)	0.003	0.007	0.446	0.323

Restricted Model		Unrestricted Model	
Adjusted R^2	68.09%	Adjusted R^2	68.15%
F value	40.55	F value	40.66
p-value	0.00	p-value	0.00

F*calc = 2.25
F distribution = 2.21 ($\alpha = .05$, $df_1 = 5$, $df_2 = 228$)
Probability < 0.04

Note: STAFF = number of internal audit staff; STUD = size of the institution; COMP = complexity of the institution; FED$ = government oversight of federal support dollars; NCAA = NCAA oversight over member institutions; MED = oversight of medical education programs; PUB = state legislative and public oversight of institutions; OBJV = reporting to the President; OBJIV = reporting to the Senior Vice President; OBJIII = reporting to the Vice President; OBJII = reporting to the Controller; OBJI = reporting to the Assistant Controller; CERT and YEARS = competency of the internal audit staff; PERF = work performance of the internal audit staff.

Independence of the Predictor Variables

Collinearity refers to the association, measured as the correlation, between two independent variables. Multicollinearity refers to the correlation among three or more independent variables. This is a data problem, not a problem of model specification (Hair et al. 1995). If the independent variables are too highly correlated there are several key issues: (1) adding or deleting an independent variable changes the coefficients dramatically, (2) the extra sum of squares associated with an independent variable varies, depending on which independent variables are already in the model, and (3) estimated regression coefficients individually may not be statistically significant even though a definite statistical relation exists between the dependent variable and the set of independent variables.

There are five tests for multicollinearity that are used in the current study. The first method examines the correlation matrix of independent variables. The presence of high correlation (generally those .90 and above) is the first indication of substantial collinearity (Hair et al. 1995). Bivariate correlations are estimated for each of the variables used in this study. Only two predictor variables, complexity and NCAA, have correlations higher than .50. The correlation coefficient for COMP and NCAA is .63, which is significant at the .01 level. Lack of any high correlation values does not ensure a lack of collinearity.

Variation Inflation Factors (VIF) are the diagonal elements of the inverse of the correlation matrix. VIF measures the degree to which the variance increased because

of the collinearity (Hair et al. 1995). The rule of thumb for VIF is greater than or equal to 5 or 10. The highest VIF for the variables in this study is 2.48.

The Eigenvalue, also called the characteristic root, is a measure of the amount of variance contained in the correlation matrix so that the sum of the eigenvalues is equal to the number of variables. The rule of thumb for the Eigenvalue is that it should be close to zero, with "close to" not being well defined (Hair et al. 1995). The largest Eigenvalue in the variables used in Model 1 is .96 indicating there is not a collinearity problem.

Tolerance for a variable is the percentage of variance in the independent variable not explained by other independent variables in the model (Hair et al. 1995). The rule of thumb is a Tolerance value close to one means total independence, and a Tolerance value close to zero means all the variance in the independent variable is explained by the other independent variables. Again, close to zero is not well defined. Another rule of thumb is that the Tolerance value should be .10 or larger. All the independent variables in Model 1 have Tolerance values greater than .10. The variable with the smallest Tolerance value is complexity (COMP) with a Tolerance value of .40. The variable with the second smallest Tolerance value is NCAA, with a value of .51. The analysis of the Tolerance values indicate that multicollinearity is not a problem.

The optimal method for detecting multicollinearity is the Condition Index (CI) developed by Belsley, Kuh, and Welsh (1980). CI identifies dependencies and where the collinearity problem exists. The technique produces a Condition Index and a vari-

ance decomposition proportion (VDP). An index in the neighborhood of 15-30 tends to result from an underlying near dependency with an associated correlation of .9. If the CI is high, and the VDP is greater than .50 for two or more independent variables, the collinearity not only has been detected, but the source is also identified. One CI exceeds the lower end threshold of 15 with a CI value of 19.09. However, only one VDP exceeds the .50 threshold. Therefore, the location of the multicollinearity is not identified.

The diagnostics do not indicate the presence of severe multicollinearity. However, several symptoms of multicollinearity are identified in the data, including coefficients with the wrong signs and implausible magnitude and coefficients that have high standard errors and low significance levels in spite of the fact that they are jointly highly significant.

Once collinearity has been determined, options to deal with it include:

1. omit one or more of the highly correlated variables and seek others to help the prediction.
2. use simple correlations between each predictor variable and the dependent variable to understand the relationship between the variables.
3. use principal components analysis to obtain a model that more clearly reflects the simple effects of the predictions.

Principal Component Analysis

According to Chatterjee and Price (1991), every linear regression model can be restated in terms of a set of orthogonal explanatory variables. These new variables are obtained as linear combinations of the original explanatory variables. Principal component analysis uses a mathematical procedure that transforms a set of correlated response variables into a new set of uncorrelated variables that are called principal components. Principal Component Analysis (PCA) can be used to assess the dimensionality of a data set and replace the original variables with a smaller number of underlying variables without losing any information. Principal component analysis is usually quite helpful to researchers who want to partition experimental units into subgroups so that similar experimental units belong to the same subgroup (Johnson 1998).

The first component extracted in a principal component analysis accounts for a maximal amount of total variance in the observed variables. Under typical conditions, this means that the first component will be correlated with at least some of the observed variables. It may be correlated with many. The second component extracted will have two important characteristics. First, this component will account for a maximal amount of variance in the data set that was not accounted for by the first component. Again under typical conditions, this means that the second component will be correlated with some of the observed variables that did not display strong correlations with component 1. The remaining components that are extracted in the analysis display the same two characteristics.

The independent variables in Model 1 are subjected to a principal component analysis. Unities (ones) are used in the diagonal of the correlation matrix, which computationally implies that all of the variance is common or shared. The principal axis method is used to extract the components, and this is followed by a varimax (orthogonal) rotation. There are several criteria than can be used to determine how many components should be retained for interpretation. One of the most commonly used is the eigenvalue-one criteria (Hatcher 1994). In the current study, the first five components display eigenvalues greater than one. Therefore, the first five components are retained for rotation. Combined they account for 70.35% of the total variance.

Independent variables and the corresponding principal component factor loadings are presented in Table 4.11. In an orthogonal analysis, factor loadings are equivalent to bivariate correlations between the observed variables and the principal components. In interpreting the rotated factor pattern, an item is said to load on a given component if the factor loading is .40 or greater for that component, and is less than .40 for the other components (Hatcher 1994). Using this criteria, two items are found to load on the first component, NCAA and COMP. This component is labeled the "wealth component" because as the level that an institution attains in each of these two categories increases the more expense is incurred. As a higher education institution moves up the Carnegie Classification ranking system, generally, that institution is implementing programs that are more expensive. For example, doctoral programs are more expensive than masters programs, and master programs are more expensive than

bachelors programs. The same logic applies to NCAA membership. A NCAA Division I membership requires the institution fund more athletic programs and athletic scholarships than Division II.

Two items load on the second component, MED and FED$. This component is labeled the "federally regulated" component because both of these programs incur substantial federal oversight, but may be subjected to differing federal regulations. Two items load on the third component also, STUD and PUB. Public higher education institutions tend to be larger than private higher education institutions. Therefore, the third component is labeled the "size" component.

Two items loaded on the fourth component, OBJ and PERF. This component is labeled the "authority component" because one might surmise that the status of the office to which the internal audit group reports will determine authority, range and value (Scarborough 1998). The fifth component contains the highest loadings from CERT and YEARS. These are alternative measures of internal auditor competence and the component is logically labeled the "competence component."

Table 4.11

Principal Components Factor Loadings for Independent Variables

Variables	Factor1	Factor2	Factor3	Factor4	Factor5
STUD	0.30	0.35	*0.68	-0.03	0.11
COMP	0.84	0.37	0.03	0.02	0.03
FED$	0.28	*0.77	-0.13	-0.01	0.02
NCAA	0.90	0.03	0.10	0.13	0.02
MED	0.07	*0.76	0.09	0.22	-0.01
PUB	-0.04	-0.30	*0.76	0.20	-0.07
OBJ	0.07	-0.05	0.16	*0.76	0.07
CERT	0.15	-.019	-0.24	0.20	*0.78
YEARS	-0.10	0.24	0.33	-0.17	*0.71
PERF	0.05	0.24	-0.04	*0.69	-0.04

Note: Variables with a significant loading on a given component are identified with an '*'.
STAFF = number of FTE internal audit staff;
STUD = size of the institution;
COMP = complexity of the institution;
FED$ = government oversight of federal support dollars;
NCAA = NCAA oversight over member institutions;
MED = oversight of medical education programs;
PUB = state legislative and public oversight of institutions;
OBJ = objectivity of the internal audit function;
CERT and YEARS = competency of the internal audit staff;
PERF = work performance of the internal audit staff.

The principal components obtained and reported in Table 4.11 are used to estimate a principal component regression, Model 6. According to Jackson (1991), the rationale for a principal component regression relates to the problem of multicollinear-

ity. The use of principal component regression avoids this problem. The regression coefficient relating the principal components to the responses will have minimum standard errors since the predictors are uncorrelated, and for the same reason the regression coefficient will be uncorrelated. If all the principal components are used, the principal component regression will predict the responses with the same precision as OLS.

The results for Model 6 are reported in Table 4.12. Model 6 is highly significant ($p<0.000$) with an adjusted R^2 of 63.06%. The first four principal components, labeled wealth, federal regulation, size and authority, are highly significant ($p<0.000$) in the model. The fifth component, competence, is not significant ($p<0.434$) indicating that internal auditor competence is not a determinant of internal audit demand.

Table 4.12

Estimated Coefficients for Cross-Sectional Regression Model Using Principal Components

Components	Coefficient	Std. Error	t-value	p-value
Intercept	4.105	0.153	26.786	0.000
WEALTH	1.432	0.153	9.329	0.000
FED REG	2.671	0.153	17.396	0.000
SIZE	0.533	0.153	3.472	0.000
AUTHORITY	0.620	0.153	4.040	0.000
COMPETENCE	0.024	0.153	0.160	0.434
Adjusted R^2	63.06%			
F value	83.26			
Probability	0.00			

Summary

In this chapter, the methodology employed in the current study is summarized. The data used in the study and the statistical tools used to analyze the data are described. Finally, a discussion of the data analysis and results are presented. There are six models that are estimated using regression analysis, and a principal component analysis is performed. Conclusions are based on the results of the principal component analysis regression.

CHAPTER V

SUMMARY AND CONCLUSIONS

This chapter is presented in five sections. The first section summarizes the research procedures used in the current study. The second section presents the research findings. The third section discusses the contributions of this study. Section four highlights the limitations of the study and section five outlines potential extensions of the study.

Summary of Research Procedures

This study develops a model that describes the demand for internal audit in colleges and universities, with internal audit staff size the proxy for demand. A cross-sectional OLS regression is relied on to test nine hypotheses that are developed to describe the factors affecting the demand for internal audits. The nine constructs tested in the regression model are grouped into three broad categories. The first category is "organizational characteristics" and it includes size and complexity of the institution. The second category is "accountability issues" and it includes federal support of research and student aid, medical education program, NCAA membership and designation as a public or private institution. The third category is "auditor effectiveness" and it includes internal auditor objectivity, competence and performance. The OLS regression procedure also is performed using the natural log of the dependent

variable to assess the impact of the lack of normality in the data.

Three of the nine independent variables in the study are categorical variables. They are the variables measuring complexity, objectivity and NCAA membership. Three 'fixed effects' models are estimated using dummy variables for each category level of complexity, objectivity and NCAA membership. These 'fixed effects' models relax the assumptions of linear relationships between the dependent and independent variables, and also relax the specified rank order assumption used in the OLS estimations.

Principal component analysis is also performed to overcome the problems caused by multicollinearity. Principal component analysis transforms a set of correlated response variables into a new set of uncorrelated variables, called principal components. The principal component analysis permits identification of variables that share common variance and loads the observed variables into a smaller set of artificial variables that account for most of the variance in the observed variables. If the principal components are interpretable, the principal component analysis gives a much simpler description of the data than the original, observed variables. When variables that significantly load on a given component share some conceptual meaning, or seem to be measuring the same construct, they are defined as interpretable.

Research Findings and Conclusions

This study identifies a set of characteristics of higher education institutions that affect the demand for the internal audit function. Due to extreme multicollinearity among the original ten independent variables, the conclusions are restricted to the re-

sults reported in Table 4.11 and Table 4.12. These results are based on the estimation of Model 6 using the components extracted in the principal component analysis. The principal component analysis reduced the ten variables to five components. All five components are interpretable, that is, the variables that load on a given component appear to share conceptual meaning and each of the five components appear to measure a different construct. In the principal component regression, four of the five components are significant.

The first component in the current study, the component explaining the largest amount of variance, is the component comprised of the highest loadings from the variables measuring the NCAA membership level and complexity level of the institution (Carnegie classification). Both variables have loadings greater than 80 percent on the first component, which is considered highly significant. The variables are examined to determine if they seem to be measuring the same construct.

As a college or university moves up from one level in NCAA membership to another, the cost of meeting the NCAA eligibility requirements increases. More athletic programs must be added, as well as more athletic scholarships. For example, Division II schools are required to sponsor four sports for men and four sports for women. However, Division I schools are required to sponsor seven sports for men and seven sports for women. Maintaining a NCAA Division IA sports program is very expensive.

Also, moving up a level in a Carnegie Classification, the measure of complexity for higher education institutions, means incurring additional costs. First, increasing the

number of programs increases costs. Secondly, the level of the programs offered impacts cost. Capital and maintenance for the equipment required for graduate students tend to be much more expensive than that for undergraduates. Graduate programs are more expensive than undergraduate, with doctoral programs being the most expensive.

Both variables measure higher education characteristics that entail increasing costs as the level of participation increases. This component is labeled the "wealth component" because moving up a level in either variable requires greater wealth or funding. Institutions participating at the highest level in the NCAA (Division IA) and designated as the highest Carnegie Classification (Research I), generally, would be wealthy institutions.

The second significant principal component accounts for the second highest amount of variance. The variables for federally supported research and student aid programs and for medical education programs have loadings greater than 75 percent on the second component, which is considered highly significant. The variables are examined to determine if they seem to be measuring the same construct. Both programs involve a great deal of federal regulation and oversight. Federal audit requirements and cost containment guidelines have increased for both programs in recent years. The second component appears to measure a new construct that is labeled "federally regulated" component.

The third component has high loadings for the size variable, measured by student enrollment, and the variable designating an institution as public or private. Generally, public institutions are larger than private institutions when size is measured

in student enrollment. The two variables seem to share the same conceptual meaning in that they both measure size. Therefore, the third component is labeled the "size" component.

The objectivity, or reporting level of the internal audit staff, and the percent of audit recommendations implemented by administration have significant loadings on the fourth component. This component indicates that a higher reporting status in the organization ensures that more internal audit recommendations are implemented. Internal auditors make recommendations for improving internal controls within an organization, and it is management's responsibility to see that those recommendations are implemented. Generally, a higher reporting status within an organization is perceived to ensure greater objectivity of the internal audit function. However, the fourth component indicates that a higher reporting status within an organization gives the internal audit function greater authority to require compliance with their recommendations. Therefore, the new construct measured by the fourth component is labeled the "authority" component.

External audit research finds both years of service of the internal audit staff and the percent of audit staff with professional certifications are statistically significant measures of internal audit competence. These two variables have significant loadings on the fifth component, indicating that they are measuring the same construct. The fifth component is labeled the "competence" component.

The first component, wealth, was statistically significant in the Model 6 ($p<0.000$). Internal auditors perform various types of audits, including financial, com-

pliance and operational. Traditionally, internal audit effort has focused on financial and compliance audits. Financial audits examine the financial controls of an organization. Compliance audits evaluate the controls developed to ensure compliance with rules, regulations, policies and procedures that govern an institution. As organizations have expanded and become more decentralized, internal audit effort has extended to operational audits. Operational audits focus on evaluating processes with the objective of identifying ways to improve the efficiency and effectiveness of operations.

As the number and level of complexity of the programs within the organization increase, it becomes more difficult for administration to identify inefficiencies. The statistical significance of the first principal component, the wealth component, may indicate that as the number of academic, research and athletic programs in the institution increases, administration recognizes the need for greater efficiency in operations and demands that more audit effort be expended on operational audits. That is, the internal audit function is expected to identify ways of making the institution more efficient. The "wealthy" institutions may hire more internal auditors to perform operational audits in addition to the traditional financial and compliance audits already being performed in the institution.

Another explanation for the significance of the wealth component may be related to funding for the internal audit function. Institutions operating within limited budgets seek ways to reduce or maintain the level of overhead costs and internal audit is an overhead function. Since internal audit does not contribute to higher education's basic missions to provide instruction or produce research, this function may be given

very low priority in funding decisions. However, the wealthier institutions, with more academic and athletic programs and larger operating budgets, may be able to afford more internal auditors and give the function higher priority.

The second component, federal regulation, was statistically significant in Model 6 ($p < 0.000$). The results for this component might be interpreted to mean that higher education administrators operating at institutions with greater government oversight give compliance auditing very high priority and demand more auditors to perform compliance audits. The costs of noncompliance, in terms of loss of future funding, disallowance of reimbursed costs, fines and penalties, can be very significant to an institution. Administrators may perceive that the benefits of additional internal auditors to identify noncompliance issues before they are found by external auditors may outweigh the costs of the additional internal auditors.

Colleges and universities are reimbursed for their part of their overhead costs related to federally sponsored research and health services programs. Therefore, college and university administrators have an incentive to direct overhead costs to these sponsored programs. Since internal audit is an overhead function, institutions are able to share some of the costs of internal audit services with these federal programs through overhead reimbursement; therefore, administrators may be willing to increase audit staffs for these programs.

The fourth component, authority, is statistically significant in the estimation of Model 6 ($p < 0.000$). The internal audit profession has long taken the position that in order for the internal audit function to be effective it should report to the President or

Board, and the principal component regression results clearly support that position. However, the two variables that load on this component may indicate that the perceived authority of the internal audit function may be a more significant determinant of internal audit demand than the objectivity of the audit function. This result could be attributed to the fact that administration sees measurable improvements in the organization due to the implementation of the internal audit function.

An alternative explanation may be that administrators use the internal audit function in a management consultant capacity, where the internal auditor is assigned projects related to financial and operational improvements that would normally be performed by management. The internal audit function utilized in this manner would be part of the management team and might not meet the internal audit standards for objectivity and independence. That is, the internal audit function would be acting more like a management function than an internal audit function and measuring the number of employees in the internal audit department as internal audit staff would be misleading.

The fifth component is not significant in the principal component regression model. This result may indicate that an institution that hires less competent internal audit staff, that is, staff with less experience and professional certifications, may have to hire more internal auditors. An alternative explanation may be that administrators use a measure of competence that differs from that used by external auditors. Colleges and universities are among the most complex organizations in modern society. They operate with conflicting missions and unique administrative and accounting procedures. Therefore, higher education administrators may place a higher priority on

previous higher education experience than they place on accounting/auditing experience and certification when deciding how many internal auditors are required to meet the organizations audit demands.

Contributions of the Study

This study develops a model that describes the demand for internal audit in colleges and universities. There is no previous published research describing such a model. The results suggest that the model is useful in identifying organizational characteristics and issues that impact the demand for internal audit services by higher education administrators and governing boards. This study also identifies five new constructs that are based on combinations of higher education characteristics. These constructs provide new insight into describing the demand for internal audit services. The results demonstrate that four basic characteristics, wealth, federal regulation, size of a higher education institution and the perceived authority of the internal audit function explain 63.06% of the variance in the demand for internal audit services in the higher education institution.

Secondly, the results of this study provide internal audit directors concise insight into the higher education characteristics that the governing board and administrators consider significant when making internal audit staffing decisions. The internal audit literature indicates that the size of the institution has been the major characteristic considered by audit directors when making internal audit staff requests. The current study identifies several organizational and internal audit characteristics that impact the demand for internal audit and condenses them into five concise constructs.

Four of these constructs are significant determinants of the size of the internal audit departments in U. S. colleges and universities. This information should be useful to internal audit directors when assessing their audit resource requirements and making resource allocation decisions during the audit planning process.

Also, internal audit directors estimate the number of internal auditors required to provide adequate audit coverage within an organization, but the governing board and senior administrators decide how many will be hired. This study provides internal audit directors insight into the constructs that have been considered significant by institutional administrators when making staffing decisions.

A third contribution of this study is developing a model that gives college and university administrators, audit committees and governing boards insight into what higher education characteristics contribute significantly to the demand for internal audit services. They should find this model to be a useful decision-making tool when implementing, staffing or outsourcing an internal audit function in their organizations. Currently, outsourcing of the internal audit function to external audit firms is a highly visible issue. The model developed in this study should be especially useful in supporting outsourcing decisions. College and university administrators, audit committees, and governing boards might assess the audit demands of their institution based on this model and determine if in-house auditors can meet the demands or if some or all of the internal audit function should be outsourced. The results may also be useful to public accounting firms seeking opportunities to provide internal audit services to college and university administrators. The model provides a concise model that

might be useful to these firms when developing cost-effective proposals for internal audit services.

Finally, this study provides internal audit directors and staff insight into the way higher education administrators and boards view the competence of the internal auditor function. Higher education administrators may evaluate the audit function using a different set of criteria than that adopted by audit directors. One implication of this may be that the audit function will not attain the position of functional success and acceptance that it seeks. This study may provide the impetus for audit directors on individual campuses to work with the campus administrators in discovering useful and common measures of internal auditor competence.

Limitations of the Study

One limitation of this study is the fact that this study used Association of College and University Auditor survey data, which could impact the study's external validity. This is a unique population, which may differ from a totally random sample of audit directors selected from all higher education institutions in the country. Results, therefore, may be generalized to all ACUA members, and only assumptions can be made of the application of the results to nonmembers.

Second, the results of the study might be limited by some of the variables used in the study. The dependent variable proxying for the demand for internal audit used in this study is the number of auditors. Internal audit is an administrative function and part of the overhead of a college or university. Therefore, internal audit staffing decisions may be impacted by the cost of the audit staff. The demand for internal audit

may be a funding decision. Also, the some of the predictor variables are not independent; therefore, severe multicollinearity in the data prohibited the testing of the original hypotheses developed in this study.

Finally, the explanatory variables may not be independent with respect to causality. Possibly, the uncontrollable environmental factors of organizational characteristics (size and complexity) and accountability issues (federal support, NCAA membership, medical education programs and status as a public institution) influence the controllable factors (internal audit effectiveness). It may be that administration decides how much effectiveness they want, at least in part, because of their environment. If so, the higher education organizational characteristics and accountability issues influence both internal audit effectiveness and internal audit demand, while internal audit effectiveness only influences internal audit demand. The models used in the current study did not test for this possible underlying causal structure.

Potential Extensions of the Study

Results may be generalized to all ACUA members, and only assumptions can be made of the application of the results to nonmembers. An extension of this study to include audit directors selected from all higher education institutions in the country could enhance the generalizability of the study.

The model developed in this study could be adapted to describe the demand for internal audit services in the private sector or other nonprofit industries. The health care industry would be an interesting extension given the significance that a medical education program had in this study.

The results of the study might be improved by the use of different variables. The dependent variable proxying for the demand for internal audit used in this study is the number of auditors. The demand for internal audit may be dependent upon the availability of funds. The model might be improved by using the cost of the internal audit function as the dependent variable. Also, significant multicollinearity problems in the data prohibited the testing of the original hypotheses developed in this study. Uncorrelated variables to measure the nine constructs might be identified and used to tests the nine hypotheses developed in Model 1.

If the higher education organizational characteristics and accountability issues influence both internal audit effectiveness and internal audit demand, while internal audit effectiveness only influences internal audit demand, a model that could test for these causal structures would be useful. Such a model would most appropriately be tested with a structural equation model or through path analysis.

This study describes the constructs that are significant determinants of the existing size of internal audit functions at various higher education institutions, that is, "what is." The identification of the most efficient and effective internal audit functions could lead to the development of a model that predicts what the staff size of the internal audit function should be. Such a model would greatly improve the process of staffing internal audit functions and ensuring sufficient internal audit coverage.

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APPENDIX A

DESCRIPTION OF CARNEGIE CLASSIFICATIONS

USED TO RANK COMPLEXITY OF INSTITUTIONS

Carnegie Classification

The Carnegie classification includes all colleges and universities in the United States that are degree-granting and accredited by an agency recognized by the U. S. Secretary of Education.

Research Universities I—These institutions offer a full range of baccalaureate programs, are committed to graduate education through the doctorate, and give high priority to research. They award 50 or more doctoral degrees each year. In addition, they receive annually $40-million or more in federal support.

Research Universities II—These institutions offer a full range of baccalaureate programs, are committed to graduate education through the doctorate, and give high priority to research. They award 50 or more doctoral degrees each year. In addition, they receive annually between $15.5-million and $40-million or more in federal support.

Doctoral Universities I—In addition to offering a full range of baccalaureate programs, the mission of these institutions includes a commitment to graduate education through the doctorate. They award at least 40 doctoral degrees annually in five or more disciplines.

Doctoral Universities II—In addition to offering a full range of baccalaureate programs, the mission of these institutions includes a commitment to graduate

education through the doctorate. They award at least 10 doctoral degrees annually in three or more disciplines, or 20 or more doctoral degrees in one or more disciplines.

Master's (comprehensive) Universities and Colleges I—These institutions offer a full range of baccalaureate programs and are committed to graduate education through the master's degree. They award 40 or more master's degrees annually in three or more disciplines.

Master's (comprehensive) Universities and Colleges II—These institutions offer a full range of baccalaureate programs and are committed to graduate education through the master's degree. They award 20 or more master's degrees annually in one or more disciplines.

Baccalaureate (liberal arts) Colleges I—These institutions are primarily undergraduate colleges with major emphasis on baccalaureate degree programs. They are selective in admissions and award 40 percent of their baccalaureate degrees in liberal arts fields.

Baccalaureate (liberal arts) Colleges II—These institutions are primarily undergraduate colleges with major emphasis on baccalaureate degree programs. They are less selective in admissions and award less than 40 percent of their baccalaureate degrees in liberal arts fields.

Associate of Arts Colleges—These institutions offer associate of arts degree programs and with few exceptions, offer no baccalaureate degrees.

Professional Schools and Specialized Institutions—These institutions offer degrees ranging from bachelor's to the doctorate. At least 50 percent of the degrees awarded by these institutions are in a specialized field. Specialized institutions include: theological seminaries, medical schools, health professional schools, schools of law, military institutes, and tribal colleges.

APPENDIX B

ACUA ABACUS SURVEY FOR FISCAL YEAR 1996

Association of College and University Auditors

PLEASE ENTER YOUR ACUA MEMBER NUMBER [ ] 2
VERY IMPORTANT!

ABACUS '96

Analytical Benchmarking for Auditors in the College and University Sector

DEADLINE: May 30, 1997

1. **Total operating expenses for FY 96:** $_____ 3

2. **Total assets* (all funds) as of FYE 96:** $_____ 4
*This is all assets before liabilities. This is not "net assets".

3. **To whom does the audit function in your institution *principally* report?** (Check only one)
   - 5-1 ☐ Board of Trustees or Board of Directors
   - 2 ☐ President/Chancellor
   - 3 ☐ Senior or Executive Vice President
   - 4 ☐ Vice President
   - 5 ☐ Controller
   - 6 ☐ Other (Please specify) _____

4. **Who audits your institution's annual financial statements?** (Check only one)
   - 6-1 ☐ Big 6 CPA firm (go to question 5)
   - 2 ☐ CPA firm other than Big 6 (go to question 5)
   - 3 ☐ The state auditor's office or equivalent (go to question 7)
   - 4 ☐ No external audit (go to question 7)
   - 5 ☐ Other (Please describe) _____ (go to question 7)

5. **What were the total external audit fees paid by your institution in FY 1996 for all audits (excluding contracted internal audits)?** $_____ 7

6a. **How many years ago did your institution last change external auditors or rebid external audit services, if applicable?**
   - 8 _____ years ago
   - -98 ☐ Do not know
   - -99 ☐ Not applicable

6b. **If you do not know, do you think it has been over 10 years?**
   - 9-1 ☐ Yes
   - 2 ☐ No
   - 3 ☐ Do not know

7. **How many years ago did you last have an external Quality Assurance Review?**
   - 10-1 ☐ Have never had one (Skip to question 9)
   - 2 ☐ Had one longer than 10 years ago (Skip to question 9)
   - 3 ☐ Had one within last 10 years

   If within last 10 years, how long ago? 11 _____ **years** **(Round to nearest half year, using ".5" for a half year.)**

Reply to question 8 only if you have had an external Quality Assurance Review (QAR) performed during the last 10 years.

8. **Who performed the external QAR? (Choose only one)**
   (If a combination was used please indicate the leader of the review.)
   - 12-1 ☐ CPA firm (your auditors)
   - 2 ☐ CPA firm (not your auditors)
   - 3 ☐ Institute of Internal Auditors
   - 4 ☐ Peer Group
   - 5 ☐ Other (please specify) _____

9. Please indicate the number of internal audit professionals on your institution's staff in. . . (include any contracted or outsourced auditors in your count)

13 #_____ FY 96 *(This number should equal your response to question number 6 on the Database Verification page.)*
14 #_____ FY 95
15 #_____ FY 94

10. Please indicate the number of staff who departed from Internal Audit in FY 96 due to each of the following reasons.

16 #_____ Moved inside the institution
17 #_____ Left the institution
18 #_____ Retired
19 #_____ Other (please specify) _____
20 #_____ Total staff departures for FY 96 (indicate "0" if none.)

11. Please indicate the number of *dedicated* audit staff in your institution for each category below as of the end of FY 96. (Do not include any contracted staff. Also, do not calculate FTE for this question. Supply data only about dedicated auditors. Indicate "0" if none.)

21 #_____ Information Systems Auditors
22 #_____ Construction/Contract Auditors
23 #_____ Financial Auditors
24 #_____ Operational Auditors
25 #_____ Investigative Auditors
26 #_____ Environmental Auditors
27 #_____ Investment/Treasury Auditors
28 #_____ Assistance to External Auditors
29 #_____ Management Advisory Services
30 #_____ General (not dedicated to a specific type of audit)
31 #_____ *Other (please specify)* _____
32 #_____ Total Auditors (this number should equal your response to question 6 on the Database Verification page minus any contracted staff reported in question 12 below)

12. Please indicate the number of external consultants (contracted staff-FTE) hired by your institution for each category below as of the end of FY 96. (Indicate "0" if none.)

33 #_____ Information Systems Auditors
34 #_____ Construction/Contract Auditors
35 #_____ Financial Auditors
36 #_____ Operational Auditors
37 #_____ Investigative Auditors
38 #_____ Environmental Auditors
39 #_____ Investment/Treasury Auditors
40 #_____ Assistance to External Auditors
41 #_____ Management Advisory Services
42 #_____ Other (please specify) _____
43 #_____ Total contracted staff-FTE (Indicate "0" if none.)

13. Please indicate the breakdown of the time spent by your organization on each of the following activities as a percentage of your organization's total audit effort for FY 96. (This is for your staff only. Please do not include audit efforts assigned to contracted staff.)

44 _____% Information systems auditing
45 _____% Construction/contract auditing
46 _____% Financial auditing
47 _____% Operational auditing
48 _____% Investigative auditing
49 _____% Environmental auditing
50 _____% Investment/treasury auditing
51 _____% Assistance to external auditing
52 _____% Management advisory services
53 _____% Administrative activities
54 _____% Training
55 _____% Other (please specify) _____
100% Total Audit Effort

RE: CAE

14. Which of the following certification(s) does your institution's Chief Audit Executive (CAE*) have? (Check all that apply)

*CAE refers to the Chief Auditor of the ACUA member organization. This may be a Director, Vice President, Auditor General, Inspector General, Internal Auditor, etc. It includes the single auditor at one-person shops. There should be only one such person at each organizational member of ACUA.

56 ☐ CPA or CA
57 ☐ CIA
58 ☐ CISA
59 ☐ CFE
60 ☐ Other certification(s) (please specify) _____

15. Please indicate the highest education level obtained by your institution's CAE. (Check only one)

61 1 ☐ AA/AS
2 ☐ BA/BS
3 ☐ Masters
4 ☐ Doctorate/JD/PhD

16. Regarding your institution's CAE, please indicate his/her number of years of. . .

Internal auditing experience ..... _____ years 62
Public accounting experience ..... _____ years 63
Other business experience ..... _____ years 64
(Do not include internal auditing or public accounting experience.)
Total experience of the CAE
(Total of the above) ..... _____ years 65

The following is a CONFIDENTIAL QUESTION: Neither the ACUA office nor any ACUA member will have access to the detail data you submit in response to this question:

17. Chief Audit Executive's salary: $ _____ 66 **(nearest $1,000)**

RE: AUDIT MANAGERS

18. Please indicate the number of Audit Manager(s) in your institution who have obtained one or more certifications (i.e., CA, CPA, CIA, CISA, CFE, etc.). (Indicate "0" if applicable)

67 #_____ Have no certification
68 #_____ Have one certification
69 #_____ Have two or more certifications
70 #_____ Total Audit Manager(s) in your office (Total of the above)

19. How many of your institution's Audit Manager(s) are CIAs? # _____ 71

20. Please indicate the highest education level obtained by each of your institution's Audit Manager(s). (Indicate "0" if applicable.)

72 #_____ Have an AA/AS
73 #_____ Have a BA/BS
74 #_____ Have a Masters
75 #_____ Have a Doctorate/JD/PhD
76 #_____ Total Audit Manager(s) in your office (Total of the above)
(This should be the same total number as indicated for question 18.)

21. For all of your institution's Audit Manager(s), please provide the *average* number of years of. . .

Internal auditing experience ..... _____ years 77
Public accounting experience ..... _____ years 78
Other business experience ..... _____ years 79
(Do not include internal auditing or public accounting experience.)
Total average experience of the Audit Manager(s)
(Total of the above) ..... _____ years 80

The following is a CONFIDENTIAL QUESTION: Neither the ACUA office nor any ACUA member will have access to the detail data you submit in response to this question.

22. Audit Manager(s) average salary: $ _____ 81 **(nearest $1,000)**

RE: AUDIT STAFF (OTHER THAN CAE AND MANAGERS)

23. How many of your Staff Auditor(s) (where "Staff Auditor" excludes the CAE and Audit Managers) have obtained one or more certifications (CA, CPA, CIA, CISA, CFE, etc.)?

82 #_____ Have no certification
83 #_____ Have one certification
84 #_____ Have two or more certifications
85 #_____ *Total Staff Auditor(s) in your office (Total of the above)*

24. Please indicate the number of Staff Auditor(s) in your institution who are CIAs: #_____ 86

25. Please indicate the highest education level obtained by each of your institution's Staff Auditor(s). (Indicate "0" if applicable.)

87 #_____ Have an AA/AS
88 #_____ Have a BA/BS
89 #_____ Have a Masters
90 #_____ Have a Doctorate/JD/PhD
91 #_____ *Total Staff Auditor(s) in your office. (Total of the above)*
(This should be the same total number as indicated for question 23.)

26. For all of your institution's Staff Auditor(s), please provide the *average* number of years of...

Internal auditing experience ..... _____ years 92
Public accounting experience ..... _____ years 93
Other business experience ..... _____ years 94
(Do not include internal auditing or public accounting experience.)
Total average experience of the Staff Auditor(s)
(Total of the above) ..... _____ years 95

The following is a CONFIDENTIAL QUESTION. Neither the ACUA office nor any ACUA member will have access to the detail data you submit in response to this question.

27. Staff Auditor(s) average salary: $_____ 96 **(nearest $1,000)**

28. What was the average elapsed time from entrance conference to completion of field work for audits completed in FY 96? _____ days 97

29. What was the average elapsed time from completion of fieldwork to draft report for audits completed in FY 96? _____ days 98

30. What was the average elapsed time from date of draft report to issuance of final report for audits completed in FY 96? _____ days 99

31. What was the percentage of audit recommendations implemented during FY 1996? ____% 100

32. What percentage of the time spent on audits completed in 1996 was devoted to:

101 _____% Planning and preparation/preliminary survey
102 _____% Fieldwork
103 _____% Reporting
104 _____% Other (please specify) _____
100% Total Audit Time

33. What were the average training hours per professional staff member for FY 96?
_____ hours per professional staff member 105

34. What was the average training expense per professional staff member for FY 96? (include all related travel costs) $_____per professional staff member 106

35. What were the annual computer equipment and software expenditures per professional staff member for:

FY 96 $_____ per professional staff member 107
FY 95 $_____ per professional staff member 108
FY 94 $_____ per professional staff member 109

36. Which of the following personal computer operating systems does your institution's Internal Audit Department use? (Check all that apply)

110 ☐ DOS
111 ☐ *Windows*
112 ☐ Macintosh
113 ☐ Other (please specify) _____
114 ☐ *None (You do not use PCs)*

37. How many total computers are available for use by all of your professional audit staff? (Indicate "0" if none.)

115 #_____ Desktops
116 #_____ Laptops
117 #_____ Palmtops

38. What type of Internet services are available to your institution's Internal Audit Department?

	Currently available	Plan to make available within the next 12 months	Not currently available and there are no plans to make available within the next 12 months
E-mail	☐ 1	☐ 2	☐ 118 3
WEB browsers	☐ 1	☐ 2	☐ 119 3
Intranet (corporate internal WEB)	☐ 1	☐ 2	☐ 120 3

39. Does your institution's Internal Audit Department use the services of a LAN (file server, application server, printing, etc.)? 121 ☐ Yes ☐ No

40. What is the frequency of internal audit staff meetings at your institution? (Check only one)

122-1 ☐ Daily
2 ☐ Weekly
3 ☐ Bi-weekly
4 ☐ Monthly
5 ☐ As needed
6 ☐ Never
7 ☐ Other (please specify) _____

41. What is the frequency of written staff performance evaluations at your institution? (Check only one)

123 1 ☐ Annually
2 ☐ Quarterly
3 ☐ After each audit
4 ☐ Never
5 ☐ Other (please specify) _____

42. As a common practice, do you use client surveys after your audits as a QA tool? (Check only one)

124-1 ☐ No (skip to question 44)
2 ☐ Yes (verbal surveys)
3 ☐ Yes (written surveys)
4 ☐ Yes, both verbal and written surveys

43. If you use client surveys, how frequently do you generally conduct them? (Check only one)

125-1 ☐ Annually
2 ☐ Quarterly
3 ☐ After each audit
4 ☐ Never
5 ☐ Other (please specify) _____

44. Does your institution operate a hospital? 126 ☐ Yes ☐ No	
45. Does your institution operate a faculty practice plan? 127 ☐ Yes ☐ No	
The following section is only for institutions which operate a hospital or faculty practice plan. (You are finished completing this survey if you answered "No" to both questions 44 and 45.)	
46. Indicate the number of dedicated staff members who are assigned to hospital or faculty practice plan audits. (Include contracted staff, FTE): #_____ **people** 128	
47. Number of licensed hospital beds:	**#**_____ **beds** 129
48. Number of annual inpatient days:	**#**_____ **days** 130
49. Number of outpatient visits:	**#**_____ **visits** 131
50. Annual net inpatient revenue:	**$**_____ 132
51. Annual net outpatient revenue:	**$**_____ 133
52. How is your organization structured? (Check only one) 134-1 ☐ Not-for-profit hospital 2 ☐ Academic teaching institution with a hospital affiliate (does not own the hospital) 3 ☐ Academic teaching institution which owns a hospital 4 ☐ Other (please specify) _____	

Thank you for participating in this survey.

Please remember to...

- Make a copy of your completed questionnaire for your records
- Enter your ACUA member number in the box in the upper right corner of page one
- Return both your questionnaire *AND* the "Database Verification Page" (even if your database information is already correct).

Please return your form and "Database Verification Page" in the enclosed postage-paid envelope by May 30, 1997 to:

INDUSTRY INSIGHTS, INC.
PO Box 20127
Columbus, OH 43220-0127

For Internal Use Only

I.I. Code: _____

Public/Private: **Public** ☐ 135-1 **Private** ☐ 2

No. of IA professional staff: _____ 136