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Long-term debt in college and university institutional finance

James Alan Shultz
William & Mary - School of Education

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LONG TERM DEBT IN

COLLEGE AND UNIVERSITY INSTITUTIONAL FINANCE

A Dissertation

Presented to

The Faculty of the School of Education

The College of William and Mary in Virginia

In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

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by

James Alan Shultz

March 16, 2000

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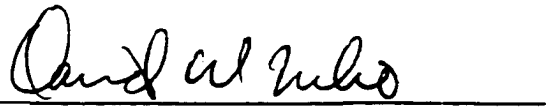
Approved March 16, 2000 by



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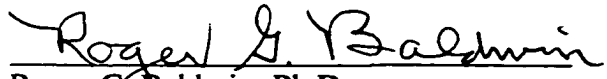

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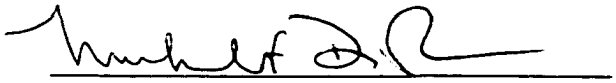

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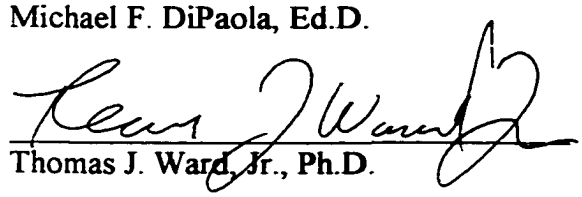

Thomas J. Ward, Jr., Ph.D.

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ABSTRACT

The purpose of this correlation study was to investigate the relationship between revenue, endowment level, replacement value of buildings and equipment, fiscal year, level of long term debt, and debt as a percentage of total long term financing in four-year American colleges and universities. The source of financial data was the institutional survey data base of the National Center for Education Statistics, Integrated Postsecondary Education Data System, Annual Finance Survey, for fiscal years 1988-89 through 1995-96.

The research questions focused on change in level of institutional long term debt during the period, the relationship between fixed asset investment and long term debt, change in institutional long term debt as a percentage of total long term financing, and the combined influence of revenue, endowment value, replacement value of buildings and equipment, and fiscal year on level of long term debt and on debt as a percentage of total long term financing. The data analysis controlled for private versus public

institutional governance and also controlled for institutional size and mission by grouping institutional data using the Carnegie Foundation for the Advancement of Teaching's four-year higher education institutional classification.

For all colleges and universities as a whole, a model combining annual revenue, endowment value, estimated replacement value of buildings and equipment, and fiscal year shared 77% of their variation with amount of long term debt. The same variables combined to predict only 1% of the variation in debt as a percentage of total long term financing.

JAMES ALAN SHULTZ

EDUCATIONAL POLICY, PLANNING AND LEADERSHIP PROGRAM

HIGHER EDUCATION CONCENTRATION

SCHOOL OF EDUCATION

THE COLLEGE OF WILLIAM AND MARY IN VIRGINIA

LONG TERM DEBT IN

COLLEGE AND UNIVERSITY INSTITUTIONAL FINANCE

Chapter 1 - Introduction

Financial decision makers in an increasing number of American colleges and universities committed their institutions to long term debt from the late 1980s through the mid 1990s, even though these actions increased institutional financial risk during a period of substantial financial uncertainty in higher education (King, Anderson, Cyganowski & Hennigan, 1994). Institutional leaders turned to long term borrowing to renew or replace aging facilities first constructed in the 1950s and 1960s, to meet demands for long term investment in new technology, to finance increasing needs for institutional student financial aid funds, to acquire state of the art facilities and equipment to remain competitive, and to buffer cyclical patterns in other capital streams (King et al.; Klein, 1992).

Between 1987 and 1997, long term borrowing activity by higher education institutions in the United States averaged $7.9 billion per year, including new borrowing and refinancing existing debt (Hennigan, 1998). Recently, a national credit rating organization listed long term credit ratings for 171 private American colleges and universities and for 133 American public institutions and state systems of higher education ("Positive Outlook," 1998; "Standard and Poor's Private," 1997).

When a college or university issues long term debt or carries outstanding unpaid debt in its financial structure, there are important consequences for institutional autonomy and financial planning. The legal, financial and technical steps necessary for

issuing debt, the need to establish and maintain a credit rating, and continuing financial disclosure and security obligations under debt agreements all substantially commit institutional administrators to outside parties in some form (Klein, 1992).

Issuing and carrying debt introduces several new dimensions into institutional financial operations and planning. Institutional officers must ensure that cash is available in a timely manner to meet debt service payments. These cash requirements, in turn, become fixed obligations that divert funds from program operating expenditures. Meeting the legal and financial analysis requirements for executing debt instruments and administering debt agreements requires sophisticated knowledge and skills (Forrester, 1988).

Another important consequence of debt is the potential additional risk that it brings to an institution's financial structure (Weston & Brigham, 1981). On the one hand, both profit-making and nonprofit enterprises finance a majority of their permanent (fixed) levels of long term assets from permanent sources of funds controlled by the organization--funds contributed by owners (shareholders, or sponsors in the case of nonprofit enterprises) and surplus funds generated from operations (profits, or net increases in fund balance in the case of nonprofit organizations). On the other hand, by issuing long term debt, an organization adds to its financial or material assets, but debt as the source of financing does not come from owners, sponsors, or surpluses from operations. Rather, by issuing long term debt, the organization adds to its assets but also adds to its list of fixed future payment obligations, in the form of a legal obligation to return borrowed principal to the lender with interest, at fixed times and in fixed amounts.

Long term borrowing means that assets are increased and placed into service in support of organizational missions and programs without increasing immediate owner or sponsor investment. This is sometimes called financial leverage. In other words, debt leverages or enhances other financial resources built up from sponsor investments and operating surpluses by enabling the organization to secure additional assets without immediately using funds from operating surpluses or from owners or sponsors. At the same time, however, long term debt may add risk to the financial structure. All organizations run the normal business (operating) risk that current revenues may not be sufficient to cover current expenditures. With the added fixed financial commitment that comes with financial leverage, colleges and universities run the added financial risk that revenue may not be sufficient to cover both variable operating expenses and some fixed level of debt principal and interest payments (Ross & Westerfield, 1988; Weston & Brigham, 1981).

Although there is substantial evidence that colleges and universities as a whole in the United States increased long term borrowing in the 1990s to record levels (Hennigan, 1998), it is not clear whether long term debt at the institutional level increased in proportion to other sources of institutional finance and, therefore, whether the use of long term debt in the 1990s increased institutional financial risk. Of the studies and reports that have been published on institutional debt in higher education, few focused on the role of debt in college and university financial structures, and there are no recent comprehensive studies based on college and university institutional level financial data.

Recent studies (Adams, 1997; Kaiser, 1996) on the use of long term financing in higher education concentrated on describing and documenting needs for new facilities and facilities renewal, and on the process of securing funding for these capital investments, rather than on institutional debt levels in the context of overall financial structure. Past literature (Forrester, 1988; King et al., 1994; Klein, 1992) on the topic aimed at institutional administrators and financial executives focused on the mechanics and administrative procedures of issuing and managing debt.

The private financial services industry ("Moody's New Analytical Measures," 1997) regularly issues studies and reports on higher education long term borrowing and credit ratings, yet these primarily are aimed at informing financial market participants of general trends and conditions in higher education that may affect credit worthiness and factors used to assess credit potential and develop institutional credit ratings. Some works (Dunn, 1989a; Massy, 1996), on the other hand, included treatments of debt in the context of strategic financial planning and financial modeling, yet these lacked data on actual practice and did not present evidence of the impact of long term borrowing on institutional financial structure. Although some studies (Libby, 1984; Sturtz, 1990) have been based on empirical evidence of college and university debt issuing practices, these works only concentrated on large research universities and analyzed characteristics of debt instruments and debt issuing procedures rather than the impact of long term debt on institutional financial leverage and financial risk.

Problem

The problem addressed by this study was whether long term debt increased in relative importance as a source of financing at the institutional level in American colleges and universities from the late 1980s through the mid 1990s. The study also addressed whether changes in the use of long term debt correlated with changes in other key institutional financial characteristics. Finally, the study addressed whether institutional financial leverage varied with changes in the level of long term debt. Data on amounts of funds borrowed by colleges and universities on a long term basis, typically in the form of long term bonds, are readily available from financial services industry published reports and data bases (Hennigan, 1998; King et al., 1994). Knowing that an institution has increased debt indicates that the institution has taken on some immediate, additional financial risk, but this does not reveal anything about debt's role in the institution's financial structure and whether the additional risk is reasonable, manageable, or desirable (Massy, 1996).

From the late 1980s through the mid 1990s, total college and university long term borrowing in the United States increased on an average annual basis and for all years together exceeded the amount of funds borrowed in any similar previous period (Hennigan, 1998; King et al., 1994; Klein, 1992). This broad indicator of debt activity, however, does not provide information for policy makers and others interested in higher education finance on debt's impact on underlying institutional financial trends. This broad measure does not address whether facilities construction continued to be a primary predictor of actual levels of outstanding debt, how much of the increase in debt activity was related to general price inflation, whether amounts of debt issued

were changing in relation to other key indicators of institutional financial activity, and whether the use of long term debt continued to be concentrated in large research universities or to what extent its used spread in the 1990s to institutions of other sizes and missions.

Purpose

The purpose of this study was to apply Wedig's (Wedig, 1994; Wedig, Hassan & Morrisey, 1996) financial economics model of the role of debt in nonprofit organizations to data from four-year American colleges and universities to develop a better understanding of the relationship between general indicators of financial activity, amount of outstanding long term debt, and financial leverage in higher education institutional finance. Wedig argued that decision makers in nonprofit organizations are reluctant to increase financial risk to achieve organizational purposes, all other things being equal, due to the uncertainty of future levels of net surpluses from operations and sponsor contributions. However, in spite of this, according to Wedig, nonprofit organizations will increase financial risk by using debt to acquire assets if managers perceive that the risks are outweighed by anticipated economic benefits and an enhanced ability to achieve organizational missions.

If this model applies to colleges and universities, then perhaps college and university decision-makers were willing to increase long term debt and financial risk from the late 1980s through the mid 1990s to achieve institutional missions and partly offset the effects of increasing environmental uncertainty and financial resource constraints. The source of data for this study was institutional finance information on

all private and public four-year colleges and universities in the United States, as reported annually by institutions on the Finance Survey section of the Integrated Postsecondary Education Data System administered and maintained by the National Center for Education Statistics (Broyles, 1995).

Study variables are listed in Figure 1. Institutional predictor variables for key

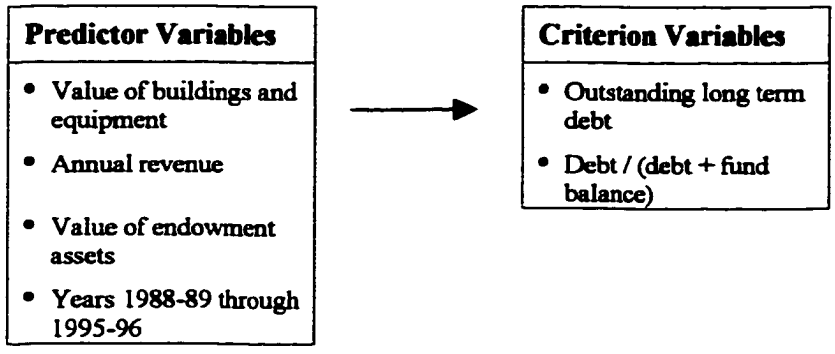

Figure 1. Predictor and criterion variables.

indicators of financial activity were value of buildings and equipment, annual revenue, value of endowment assets, and Finance Survey reporting years 1988-89 through 1995-96. The criterion variables were year-end level of outstanding unliquidated long term debt and the ratio of debt to debt plus fund balance, which is the operational definition of institutional financial leverage for this study.

This study filled a gap in the present knowledge base on the use of long term debt by institutions of higher education in the United States. The private financial services industry publishes data on the amount of long term debt issued each year, but there is no recent systematic study of how much long term debt institutions actually had outstanding during this period and whether amounts increased in recent years relative

to other key financial indicators. Policy officials at the state and national levels use information on the financial resources and financial condition of institutions of higher education for policy analysis and planning related to the adequacy of funding levels for achieving institutional missions.

This study focused on whether institutions increased their level of financial leverage from the late 1980s through the mid 1990s by taking on additional long term debt. This assessment added to the information available for policy evaluation and planning in areas affecting higher education finance. Financial administrators and other decision makers at the institutional level also will benefit from the results of this study. They will be able to use the results for categories of institutions similar to theirs as benchmarks against which to evaluate their own institution's level of financial leverage due to long term debt.

Delimitations

This study was based on institutional data on four-year, degree-granting, nonprofit private and nonprofit public colleges and universities in the United States as reported for fiscal years 1988-89 through 1995-96. The data was from an existing survey data base on higher education institutional finance rather than from an original data gathering process undertaken for this study. The conceptual framework, logical propositions, and analytical tools for the study were borrowed from one pure or theoretical social science discipline, economics, and from one applied social science field, business administration (Becher, 1989).

Although economics and business analysis provided concepts and tools to guide the research, as social science domains their assumptions about what is real and knowable are not fixed and linearly cumulative, but tentative and flexible. This made them well suited to an investigation of an organizational and institutional phenomenon like long term debt policy in complex organizational contexts.

Because they are paradigms within social science, economics and business analysis assume that reality and truth are dependent somewhat on context and the particular organizational actors involved. Social values and conventions influence the investigator's search for knowledge and the investigator's perceptions as a researcher. The investigative process does not follow a rigid set of predetermined rules but is open to a variety of potential, alternative research methods and interpretive frameworks, depending on the problem addressed and the question being asked (Toma, 1997).

Limitations

Study findings cannot be generalized to all of American higher education because data were not included from two-year institutions, from independent professional schools, from profit-making institutions, or from institutions in the target group not reporting a year-end balance of unpaid long term debt. The Integrated Postsecondary Education Data System Finance Survey data are based on annual self-report surveys completed by college and university administrators. Inherent characteristics in this data gathering method include inconsistencies in responses between institutions within the same year, inconsistencies between years, and missing or incomplete data.

By adopting a quantitative yet post hoc, uncontrolled, correlation approach to data collection and analysis, the study examines only one aspect of a larger context of organizational philosophy, strategy formulation, policy implementation, and individual and group values, roles, and actions. A larger and more complex reality, resulting in actual levels of long term debt issued by colleges and universities, exists in the arena of institutional financial policy formulation and implementation than is examined in this study. This larger reality includes individual motivations and the interaction of individuals to achieve group action.

The study used a mixed positive-postpositive methods framework because it assumed that, while there was some larger scope of human action resulting in how specific organizational actions came to be what they were, the one piece of the total selected for examination is still worthwhile knowing something about (Toma, 1997). The study is limited, therefore, in that it omitted evidence and interpretive enhancements on long term debt decision making that would be available through survey or direct contact with college and university finance officials and with financial services industry professionals who work with the higher education sector.

Definition of Terms

Only terms with broadest application to all phases of the study are defined here. Other terms, as appropriate, are defined within the particular context in which they are applied. College and university long term debt is a financial liability expected to be due and payable more than one year from the liability reporting date (National Association of College and University Business Officers, 1990). Typically, funds

borrowed on a long term basis must be returned to the lender with interest, which is a charge for the use of the funds, in specified annual amounts over the term of the loan. Often long term debt is issued in the form of bonds or a bond contract, under which the borrower pledges specific assets or other resources to guarantee return of the borrowed principal to the lender with interest.

Capital refers to physical assets or to financial assets owned or controlled by an organization which provide economic value in support of accomplishment of organizational mission or purpose. An organization's financial structure refers to how its capital, or assets, are financed or supported. The financial structure includes short term sources of financing, such as payments due from customers or clients, and short term loans to the organization. Financial structure also includes longer term sources of support, such as accumulated donor or sponsor gifts and long term loans. Capital structure refers to the permanent (fixed, long term) financial resources of the organization. Long term resources include long term debt and accumulated net earnings from operations, which is known as retained earnings or owners' equity in profit-making enterprises and known as fund balance in nonprofit organizations (Weston & Brigham, 1981). Capital structure is the long term component of overall total financial structure.

Chapter 2 - Literature Review

The use of long term debt by a college or university has several implications for institutional finance. Debt indirectly generates revenue by enabling the institution to secure long term assets to support institutional missions and revenue producing activities. Debt results in additional expenditures by creating obligations for loan repayment and payment of interest charges. Debt changes the financial structure of an institution by linking increases in physical or financial assets to repayment liabilities rather than to financial resources under the institution's control. In order to develop a better understanding of these multiple implications, literature was surveyed on long term debt in a context of higher education finance in general, institutional capital development, institutional needs for long term debt, institutional debt management and administration, alternative conceptions of debt for analyzing institutional finances, the role of debt in organizational financial structures, and possible alternative conceptual frameworks for guiding research and interpretation in this area.

Long Term Debt and Higher Education Institutional Finance

Writers in the general higher education finance literature emphasized issues of resource generation and allocation and topics related to the costs and financing of higher education for students. This view of finance draws attention to current revenue and expenditure activity rather than to the net results of financial activity over time and changes in financial structure. Hansen and Stampen (1994) related their historical

review of revenue and expenditure patterns in higher education as a whole to changes in the national economy and to public policy developments in the areas of student access, but they did not report on the role of debt financing in the expansion of higher education capacity or explicitly report on the cost of debt as an expenditure item. Similar to much of the literature on financial planning in higher education, Brinkman and Morgan (1997) approached financial strategy in terms of revenue generation and budget allocation and did not consider questions related to maintaining and enhancing financial viability through appropriate levels of borrowing.

Bowen (1980) and Winston (1993) concentrated on higher education institutional costs. Bowen's purpose was to identify the major components of cost in institutions and to develop historical estimates of total national higher education expenditures. Bowen, however, did not add to our knowledge of how debt financing might affect costs because he combined financial capital and physical capital, such as buildings and equipment, into one capital cost category.

Winston (1993) focused on how to measure the total costs of a single institution rather than make national cost estimates. Unlike Bowen (1980), Winston separated problems of physical capital cost analysis from those related to the role of financial capital. In the latter he included debt financing and the cost of using institutional financial assets, such as endowment, to acquire physical assets. In a separate work, Winston (1992) also reviewed debt in the context of how college and university accounting conventions fail to analyze and report on a complete picture of institutional economic activity. While Winston's perspective in both writings was useful for distinguishing between the cost of physical capital assets versus how they are financed,

he did not address whether colleges and universities, over time, have come to rely more on external financing, thus adding to their total costs by borrowing outside funds.

The selections by Breneman, Leslie, and Anderson (1996) in the ASHE Reader on Finance in Higher Education included no works in which the primary topic was debt in college and university finance. Ford (1996) listed debt management in his overview of the range of business, financial, and administrative activities that are required to operate a higher education institution. Meisinger and Dubeck (1996) briefly covered how debt transactions are handled in college and university financial accounting, whereas Dunn (1996) pointed out how debt considerations fit into short range and long range financial decision making. In a review of budgeting practices in higher education, Dickmeyer (1996) briefly discussed debt financing in a context of capital project budgeting. Together this work reinforced the idea that debt affects many dimensions of institutional financial activity. However, these writings were oriented toward describing and explaining debt transactions rather than toward providing actual data or analysis on debt levels among institutions or toward discussing conceptual approaches to how debt affects financial structure.

Debt levels in relation to other elements of financial structure are measured as of a point in time. Standard survey data reports on higher education finance focused on current period by period activity rather than on net financial results and changes in financial structure as of the beginning or end of fiscal periods (U.S. Department of Education, 1998; State Higher Education Executive Officers, 1998). Therefore, there were no standard national statistics in these reports on debt levels in the financial

structures of educational institutions and on the costs institutions incur to issue and carry debt.

Long Term Debt and Capital Formation

Like funds from capital fund raising campaigns and special purpose grants from external organizations for facilities construction, long term debt is an immediate source of financial capital for acquiring long term assets. The literature on capital formation and capital development in higher education, while addressing strategies other than debt to some extent, primarily was oriented toward reporting on and analyzing the various forms of and the mechanics behind long term debt financing (Anderson & Meyerson, 1987; King, 1988). Some works, like Capital Formation Alternatives (1988), were limited by the fact that the authors made little distinction between the uses of annual revenue streams supporting current operations versus sources of support that might be more suited for capital expenditures, which are physical assets lasting more than a year. These writers also blurred the line between physical capital and financial capital, which made appreciation of the differences more difficult.

Discussions of capital financing in the literature typically were presented as justifications of the need for the financial capital rather than as analyses of the features and costs of alternative sources of financing and their implications for institutional financial structure (Kaiser, 1987). Although some researchers (Eden, 1987; Capital Formation Alternatives, 1988) presented evidence on how colleges and universities are taking advantage of more varied and sophisticated ways of securing the use of capital assets, they failed to explore how these different options compare in terms of long term

costs and whether institutions have in fact altered their financial structures over time by making more use of debt financing.

Need for College and University Long Term Debt

In practice, colleges and universities typically issue long term debt to make funds available for new building construction and major facilities renovation (King et al., 1994). At the same time, long term debt, which is debt with a pay back period of more than one year, is often issued to acquire other physical assets, such as equipment, and for funding an institutional pool of student loan funds (Eden, 1987; King et al.; Tommaney, 1994).

Reporting on the results of facilities needs questionnaire surveys, Rush and Johnson (1989) analyzed responses from approximately 700 institutions, whereas Kaiser's (1996) more recent study summarized responses from approximately 400 colleges and universities. Respondents to the Rush and Johnson survey reported using long term debt for financing 60% of their physical plant construction and renovation requirements. Kaiser noted that officials responding from public institutions used long term debt for approximately 22% of their construction and renovation needs, whereas officers in private institutions reported using debt for approximately 21% of their needs.

The Rush and Johnson (1989) analysis listed percentages of reported institutional debt financing by Carnegie classification institutional category, but they combined private and public institutional responses within each category. Therefore, even if the respondent groups in the Kaiser (1996) and Rush and Johnson studies were

comparable, the user cannot determine whether private or public institutions as separate groups increased their reliance on long term debt for facilities financing needs between 1987 and 1994.

These two reports also demonstrated some limitations in the financing needs perspective of the role of long term debt in institutional finance. They interpreted physical facility requirements as periodic snap shots and did not analyze whether reported use of debt changed over time in proportion to changes in facility financing requirements. In addition, they treated debt financing as one alternative source of funds along with institutional funds and state appropriations. Debt perhaps may be understood more clearly not as a source of funds but as a financial mechanism or tool, which in turn depends on some source of funds for supporting interest cost and principal repayment in the future. Finally, they grouped a number of different types of facilities costs together for analysis, such as economic and accounting depreciation, and maintenance expenditures. These separate cost concepts must be clearly separated for assessing actual financing requirements and for evaluating the types of financial strategies suitable for each (Okoruwa, Cox & Thompson, 1994).

Dunn (1989a) and Hornfischer (1996) proposed successive steps for analysis and for implementing procedures to line up college and university financial strategies with the specific amount and timing of funds needed for physical plant construction and renovation. Dunn suggested a method for forecasting major maintenance and facility renewal requirements and presented some ideas for creating funding support for each. His major contribution was in delineating a procedure for forecasting major building sub-system maintenance and replacement costs.

Hornfischer (1996) outlined a method for small and medium-sized private institutions to coordinate overall financing strategies with long range planning in the functional areas of facilities, budgeting, endowment management, and fund raising. Although both Dunn (1989a) and Hornfischer studied connections between facilities needs and debt as a financing option, neither looked at the questions of how debt affects the institution's financial structure and whether debt levels typically change only in proportion to facilities investments or whether there might be other explanations.

College and University Debt Administration and Management Practice

Empirical Research. Most of the past research using evidence of the actual debt practices of colleges and universities or measuring how much debt they actually incurred has been limited to small samples of institutions and primarily has focused on the process and mechanics of securing and administering debt financing (Murphy, 1959; Stewart & Lyon, 1948). Felix (1979) surveyed and summarized state statutes enabling and regulating long term debt for public and private institutions. He then analyzed how taxation and spending limitations at the state level might impact institutional management's ability to borrow to meet projected facilities needs. Felix concluded that the combination of legal restrictions and limits on spending and debt in many states inhibited institutional decision makers' ability to tap into the full amount of debt financing needed to provide facilities to keep pace with projected enrollment growth.

After college and university administrators decide to borrow funds for an identified need and receive governing board approval or other appropriate approval for

project planning and implementation, administrators follow a fairly standard set of procedures in issuing long term debt (King et al., 1994; Klein, 1992). The usual steps include (a) determine the approximate amount of external funds needed, (b) decide on timing for when funds are needed, (c) review applicable laws and regulations, (d) review current interest rates and trends in debt markets, and (e) secure any outside expert assistance needed but not available within the institution, such as financial and bond advisors, bond legal counsel, and a financial markets specialist.

After reaching a preliminary borrowing agreement, institutional administrators and representatives from the lending organization or lender's representatives document the debt provisions in one or more written agreements, which are signed by all parties. These documents usually include the interest rate, length of term to loan repayment, and amount and timing of interest payments and loan principal repayment. They typically also cover security and collateral provisions in case of default on payments, financial and operating restrictions placed on the institution as a condition of receiving the funds and keeping the agreement in force, and a statement of conditions under which either party can require renegotiation or termination of the agreement (King et al., 1994; Klein, 1992).

If the debt is issued as a publicly-rated and publicly-traded borrowing in an open market, an institutional borrower must disclose operating, financial, and service demand information as a condition of the loan, both at the time of application and on an ongoing basis. Posey (1980) compared and reported on bond disclosure requirements among a sample of private and public colleges and universities that had issued long term debt. The purpose of the study was to determine whether lenders

treated private and public institutions differently for disclosure. Posey concluded that private institutional finance was viewed by the financial industry as more risky than that of public institutions and, therefore, that more disclosure information was required of private institutions.

Practice in Large Research Universities. Libby (1984) and Sturtz (1990) prepared the two most recent research-based studies on long term debt at the institutional level in higher education. Libby identified a framework of 11 action and structural dimensions for analyzing the debt-issuing process. She then reviewed 77 debt agreements entered into by three public research universities and two private research universities between 1972 and 1983. She also interviewed institutional representatives from the same five universities and interviewed debt financing experts from the private financial services industry. Libby's purpose was to assess whether change in debt agreement process and structure variables correlated with one another over the time period under consideration. She concluded that increasingly detailed financial conditions and covenants were being written into debt agreements and that amount borrowed was the variable of interest that had the highest correlation with change in agreement process and structure over time.

A formal borrowing agreement includes the interest rate, length of term to loan repayment, amount and timing of interest payments and loan principal repayment, security and collateral provisions, financial and operating restrictions, and conditions under which either party can require renegotiation or termination of the agreement. Noting an increase in the variety and complexity of borrowing arrangements entered

into by higher education administrators from the early 1970s to the mid 1980s, Sturtz (1990) hypothesized that this condition affected where and how administrators obtained the information and training they needed for taking on debt management responsibilities and that this condition influenced institutional debt policy. Sturtz gathered evidence on the amount of long term debt outstanding and amounts of new debt issued by 15 public research universities from 1975 to 1987. He also administered a questionnaire survey to officials in the sample institutions and to their external financial advisors to collect information on debt issuing practices, policies, and sources of technical and expert information related to debt management.

Sturtz (1990) concluded that the specialization and complexity of the debt management function during this period increasingly isolated debt management administrators and staff specialists from general finance and administration functions in their institutions. He found that administrators relied increasingly on external financial industry professionals for information and guidance in the area of debt issuance and management. He also found that, for debt management assistance, the institutions in the sample no longer relied primarily on traditional sources of information, such as national higher education business and management associations. Sturtz concluded that institutional governing boards typically had neither formal, written, long term policies on debt management nor guidelines for administrators on issuing institutional long term debt.

The present study of institutional debt in higher education extended and updated the work of Libby (1984) and Sturtz (1990) by documenting and analyzing data on college and university long term debt levels from the late 1980s through the mid 1990s.

The present study included data from a greater number of institutions than they did and covered a broader range of institutional sizes and missions. The study expanded on theirs by covering the relationship between debt and institutional financial structure and whether long term debt in the 1990s increased relative to other key institutional finance variables. The results of the present study complement their emphasis on the procedural and transactional aspects of issuing and managing college and university debt.

The Long Term Debt Financing Decision. The literature on debt strategy, management, and administration for decision makers and administrators was oriented toward assessing debt as a financing alternative, toward the technical knowledge requirements for planning and administering debt, and toward providing guidance and advice in planning and managing debt from the perspective of the external investment banking industry. Forrester (1990) advised college and university decision makers to review a series of strategic considerations before taking on or increasing institutional long term debt. According to Forrester, debt may not be an appropriate source of financing if the resources used to repay principal with interest are not generated from the activities associated with the assets for which the borrowed funds are used.

An institution's financial ability to absorb first-time or additional debt is known as debt capacity and is a combined measure of several factors contributing to the institution's ability to meet future repayment and interest terms (Forrester, 1990). The risk involved for an institution to take on and carry debt is made up primarily of two components: the risk that the institution will not be able to meet principal repayment

and interest time tables, and the risk that fluctuating interest rates will cause debt commitments to become more costly relative to the current debt market during the term of loan repayment. Forrester recommended that administrators consider three issues: (a) whether debt repayment will be primarily the responsibility of the unit or units within the institution which will benefit from the debt financing, (b) whether new or additional borrowing, nonetheless, preserves some debt capacity for future borrowing needs, and (c) whether the institution's economic and financial environment supports first-time or additional borrowing at an acceptable level of risk.

Among many environmental factors affecting the cost of a debt issue is a higher education institution's nonprofit status. Under local, state, and federal laws, nonprofit status usually means that the interest paid by a nonprofit borrower is treated as tax exempt income to the lender. As a consequence, interest rates that a nonprofit borrower pays, in general, are less than interest rates on loans to for-profit organizations because the interest rate paid by a nonprofit organization does not have to cover the lender's income tax. At the same time, nonprofit institutions legally are not prevented from borrowing funds in the interest-taxable loan funds market. Due to the fact that almost all private and public colleges and universities are nonprofit, the interest paid on the great majority of their long term borrowing is tax exempt to the lender. Because this means lower borrowing costs for colleges and universities, federal tax provisions affecting nonprofit status, federal regulations on tax exempt debt, and trends and conditions influencing tax exempt interest rates are of prime interest to college and university officials.

As part of the federal tax law reform movement of the 1980s, the United States Congress increased restrictions on the use of tax exempt debt, thus making rules and regulations on tax exempt borrowing a more important factor in college and university borrowing decisions. The implications of these trends and the variety and complexity of debt financing options available to colleges and universities were the topic of works like "New Approaches to Debt Financing" (1987), which was an effort to make institutional policy officers and administrators aware of a range of options as they considered whether to issue debt and in what form. This work identified and defined the roles of the major internal institutional and external actors in the debt planning, issuing, and administration process. It reviewed the features, advantages, and disadvantages of a number of different borrowing methods and instruments available to colleges and universities. It also summarized new federal restrictions and provisions affecting tax exempt debt financing included in the Tax Reform Act of 1986. One important new provision was that a private, nonprofit college or university could have no more than $150 million of outstanding tax exempt debt at any one time ("New Approaches to Debt Financing"). This limitation on private institutions remained in effect until it was rescinded by the Tax Reform Act of 1996 (Hennigan, 1998).

Publications from the private financial services industry were another source of information for administrators related to planning and managing the use of long term debt. Falwell (1994) outlined how student body characteristics, program considerations, and operating features of particular institutions were considered by credit rating organizations in determining credit worthiness either for individual institutions or for particular debt issues. Falwell also highlighted the importance of

inter-institutional comparisons for the process of how rating professionals establish particular debt credit ratings. The financial services industry performs this comparison by calculating mean and median student, program, and operating characteristics for institutions that already have credit-rated debt and then comparing the institution to be rated against these standards. An example of student characteristics usually considered is the institution's acceptance rate, which is the number of students accepted divided by the total number applying. The lower the acceptance rate, the more academically qualified the student body is considered to be.

Credit rating services may assign ratings either to a college or university as a whole or to an individual debt offering because institutions usually issue new debt through an open debt market. This means that any qualified buyer can purchase the debt instrument in the market, with the purchase price becoming the borrower's source of funds. The credit rating acts as a signal to prospective lenders and the market as a whole on the credit worthiness of the borrower or the individual debt issue. A high or good credit rating means that the borrower is a good credit risk, suggesting the ability to make debt service payments. In relative terms, higher credit ratings mean that the market and individual lenders will be willing to accept lower interest payment rates in return for the use of their funds. At the same time, however, college and university administrators sometimes have the option of saving the expenses of applying for a credit rating and other expenses of a public debt offering by negotiating directly with a lender or broker.

Although tax-exempt interest payments may result in lower interest rates, nonprofit institutions are not prevented from borrowing funds in the taxable interest

loan funds market. Kalita (1990) documented the features that may make taxable borrowing desirable for college and university administrators and policy makers. Taxable interest payments mean that federal tax provisions regulating the sale, use, and administration of funds borrowed on a tax-exempt basis do not apply. Having taxable interest payments removes rules restricting the use of the funds to tax exempt purposes, it removes limitations on the sources of funds that may be used to make principal and interest payments, and it removes ceilings on the amount of interest the borrower may realize while holding funds prior to expenditure for purposes borrowed.

These works outlined debt decision options, provided an overview of debt's strategic context, and touched on many of the factors to consider in the decision on whether to take on debt or add to existing debt. However, almost no attention was given to debt's role in changing the institution's financial structure or how changes in debt levels might relate to other changes in financial structure over time. Forrester (1990) in particular noted that, in practice, issuing debt often occurs on a project by project basis without much attention to an ideal or target financial structure or to whether the debt affects institutional financial policy guidelines.

These works offered an introduction to the decision maker for considering whether to take on debt and described the general external regulatory and market environment. One of their strengths was that some provided brief case summaries of actual institutions which were either considering whether to issue debt or which already were entering the initial implementation stages. These authors also documented how external regulatory changes in the 1980s were the motivation for decision makers' increased interest in alternative debt instruments and methods of

financing. The present study enhanced this body of literature because it focused on whether debt levels by type of institution in fact have changed since the late 1980s and on whether the role of debt in relation to other key elements of institutional financial structure have also evolved.

Institutional Debt Management and Administration. Writings prepared for the purpose of guiding college and university executives and administrators through planning, implementing and administering debt covered the terminology of debt instruments and procedures, described how interest rates are set by debt markets, addressed the relationship between interest rates and debt cost, and identified the roles and functions of various actors in the debt issuing process. Forrester (1988) covered some general, strategic topics and several technical, narrow ones, but he did not achieve an overall cohesive presentation of debt planning and administration around a unifying focus. Forrester presented summaries of legal, accounting, regulatory, and financial management considerations for debt management, but he did not link them and relate them to the overall task. In some cases Forrester briefly mentioned how financial management strategies need to be tied to debt planning and management. An example was identifying alternatives for how to support debt repayment and interest costs. However, he did not elaborate on how these important points related to the larger strategic financial picture or how they linked with the various technical elements of debt administration that he described.

Klein's (1992) work for college and university administrators documented the basic elements of debt financing and, as a whole, was more technical than Forrester's

(1988). He listed and discussed a number of alternative debt instruments and analyzed legal and regulatory requirements and restrictions involved with issuing and administering debt. Klein covered federal tax law restrictions on tax exempt debt, including limitations on debt issuance costs, restrictions on what types of projects the borrowed funds can and cannot be used for, and prohibitions on financial gains from investing borrowed funds pending application to project costs. Klein also described the structure of various debt instruments, such as revenue bonds, general obligation bonds, lease structures, variable rate bonds, and commercial paper. Whereas his approach was more technical than Forrester's, Klein's presentation was compact, organized, and readable because he wrote in non-technical language and achieved coherence by relating each topic and sub-topic to the overall theme of the administrator's role in debt management and the working knowledge and skills needed to perform this role.

King et al. (1994) provided broader coverage of the topic than either Forrester (1988) or Klein (1992) and seemed to be aiming at the more general audience of administrator and general institutional policy maker rather than just technical debt specialists. King et al. added detail on the role and functioning of external capital markets, discussed capital market segmentation based on types of borrowers and amounts borrowed, and summarized historical patterns and cycles in long term and short term interest rates. These authors helped the reader make sense of the material by organizing it around the topics of capital markets, debt structuring, and administrative procedures. They added to the content information of Forrester's and Klein's work by including a number of summary case examples in which colleges and universities issued debt, by providing a section on debt planning and implementation for funding an

internal pool of funds for student loans, and by adding appendices listing contact information for state loan authorities, higher education associations, and interest groups having additional information on institutional debt planning and management.

Together, Forrester (1988), Klein (1992) and King et al. (1994) offered a core of reference sources on higher education debt planning and administration for the practicing college and university administrator. The primary audience was administrators at private institutions because these writers assumed, for the most part, that public institutions issued debt under procedures established by their state governments. However, King et al. recognized that an increasing number of debt issues were from public institutions issuing their own debt under their state's guidelines. They acknowledged this by including some summary case examples on public institutions.

These three works, however, only partially addressed the topic of the present study: debt's effect on institutional financial structure and changes in relative institutional debt levels over time. Their treatment mainly was in reference to how existing institutional debt and analyses of an institution's future ability to support debt repayment and interest costs affect its credit rating. These writings were important, however, for documenting trends toward increased debt activity in the late 1980s to mid 1990s and for describing the increased variety and complexity of debt procedures and instruments compared to earlier periods. On the other hand, these works did not analyze whether institutions on the whole actually increased their unliquidated debt levels through the mid 1990s and whether or not debt's role in institutional financial structure changed in proportion to changes in other financial variables.

The Private Financial Services Industry View. The private, for-profit investment banking industry manages and brokers the sources of financial capital potentially available for college and university long term borrowing. One segment of this industry coordinates financing for borrowers whose interest payments qualify as income tax exempt to the lender. This tax exempt debt market is sometimes referred to as the municipal debt market or municipal bond market, but this market covers all nonprofit organizations, including private nonprofit and public nonprofit colleges and universities.

Various investment banking companies specializing in the tax exempt market have sub-specialists on staff who work exclusively with the debt issues of higher education institutions (Hennigan, 1998). For the most part, published works on the topic of college and university debt from this perspective were aimed at potential lenders (investors who specialize in college and university debt instruments), other financial services industry professionals, and college and university administrators interested in current assessments of the credit worthiness of colleges and universities and how credit assessments are made (Gonzalez & Strischek, 1988a, 1988b).

An article published by a large financial services firm provided information for administrators on how new types of tax exempt debt instruments and variable interest rate loans were opening up more options for short term and intermediate term borrowing ("Credit Impact," 1996). Heimowitz (1990) was a financial services industry specialist and wrote about various techniques for strengthening the credit rating of individual debt issues in order to reduce interest costs. In many cases, college

and university debt repayment is secured to the lender by a particular revenue source, such as student room fees on debt for student housing construction, or by a general pledge of institutional financial resources, often referred to as general obligation debt. Heimowitz discussed a number of credit enhancement options, including security pledges, such as a mortgage on a facility; other physical or financial collateral; back-up credit enhancement, such as stand-by credit or secondary credit; contracts with other financial organizations for debt purchase in case of default by the college or university; and contractual agreements that guarantee principal and interest payment, such as bank letters of credit and bond insurance.

A variety of external organizations and institutions collect, analyze, and publish quantitative data and qualitative assessments of general categories of institutions, such as private versus public institutions by size and mission. They provide these services in order to keep potential lenders and investors in debt instruments abreast of general developments in higher education affecting this segment of the debt market. On the whole, these published analyses presented higher education as a unique debt market, with market segments by institutional size, by mission, by form of institutional control, and by size and structure of typical debt issues (Hennigan, 1998). At the same time, the published literature from these organizations for the most part focused on institutions as potential consumers of debt rather than analyzing long term trends in total debt held by institutions or changes in financial health due to the impact of debt on college and university finances and financial structure.

This literature was important to a study of the use of debt by colleges and universities because it reflected the degree to which the financial industry was willing

to lend funds and its general assessments of higher education's credit worthiness. This literature provides important clues for college and university administrators on the availability of debt financing and the cost of borrowing because the more positive that the industry's attitude is toward credit worthiness, the higher college and university credit ratings will be, which translates into lower interest rates and lower interest cost. Various publications from the financial services industry concluded that higher education as a whole was financially healthy, represented a good credit risk, and offered an expanding market for lending ("Moody's New Analytical Measures," 1997; "Positive Outlook," 1998).

For the specific task of formulating college and university credit ratings, writers from the financial services industry presented some common and some differing criteria to evaluate private versus public institutions ("Positive Outlook," 1998). Similar factors included student demand, financial indicators, and analysis of debt capacity. For public institutions the ratings process also considered the state government's credit rating, state mandates and policies affecting enrollment, and the state's higher education governance structure and financial support policies.

Starting in the early 1990s, state policy factors received decreasing relative attention in evaluating public institutions because of declining state support for public institutional finances, because of a trend toward increasing size of public institution endowments, and because of the trend toward public institutions adopting private institution management practices, such as strategic planning, self-audits, and capital campaigns ("Positive Outlook, 1998"). Although public and private institutions increasingly were being reviewed against the same criteria, industry analysts

recognized that, among private institutions, the financially strong were growing stronger and the weaker institutions were not gaining ground ("Moody's New Analytical Measures," 1997; "Split Outlook," 1998).

Perhaps suggesting the wider implications of taking on and managing institutional debt, investment industry writers on higher education credit worthiness stressed the importance of several non-financial institutional characteristics ("Moody's New Analytical Measures," 1997). They indicated that factors other than financial criteria must be weighed, including (a) competitive strategy, (b) management quality and stability, (c) institutional governance, (d) strength of long range capital planning processes, (e) links between capital planning and annual budgeting, and (f) management's external political skill and established external political relationships. For assessing credit strength, these writers presented these points as well as the more traditional analysis of financial liquidity, enrollment demand, tuition discounting practices, restricted versus unrestricted revenue streams, ability to cover current and potential additional fixed debt service payments, and relative reliance for current revenues on tuition and fees versus endowment income and governmental appropriations ("Moody's New Analytical Measures").

In addition to the private financial services industry, a variety of external regulatory and oversight organizations have an interest in college and university debt and publish related studies, reports, and analyses. For example, the College Construction Loan Insurance Association was authorized by the federal Higher Education Act amendments of 1986. Although federally authorized, the Association is a profit-oriented insurer of tax exempt college and university construction bonds for

institutions with relatively low credit ratings. The Association has been criticized for not insuring enough long term loans for credit-risky institutions. However, a study concluded that because of legal requirements to earn a profit, because each state regulates the Association according to its own state lending industry practices, and because the Association must be competitive and mirror practices in the private loan insurance industry, the Association's rate of loan insurance approval was reasonable (U.S. General Accounting Office, 1995). State government oversight and regulation of public financial and management practices at the state and local level in each state frequently involves one or more aspects of debt issuance and management by both private and public colleges and universities within the state (Virginia Joint Legislative Audit and Review Commission, 1995).

Legal and Technical Issues. Issuing debt has an impact beyond just financial management considerations. For example, legal and tax considerations which, if not recognized and understood, could add considerably to an institution's cost of carrying long term debt. Clapp (1987) enumerated and analyzed provisions in federal tax law and the substantial changes affecting tax exempt debt passed at the federal level in 1986. Federal tax code provisions as revised in the late 1980s continue to provide the primary legal framework for the majority of debt issued by or on behalf of colleges and universities.

For debt to qualify as tax exempt, and thus typically be issued at a lower interest rate and lower cost, the borrower and the intended use of the funds must meet a test of what is termed governmental activity or eligible private use activity. Most debt of

public colleges and universities qualifies as public activity, whereas most debt issued directly by private institutions qualifies as eligible private activity. At least 95% of the funds raised through the debt issue must not support business or trade activities unrelated to the institution's nonprofit status (Clapp, 1987).

In addition to the $150 million ceiling on the amount of tax exempt debt that an independent institution could have outstanding at any one time ("New Approaches to Debt Financing," 1987), the federal tax code as amended in 1986 (a) covered rules on earnings from funds secured through debt and temporarily reinvested in interest-bearing financial instruments, (b) restricted the amount of issuing costs and debt repayment reserves that could be funded from the borrowed funds themselves, (c) limited the term of debt repayment in relation to the reasonable life of the project for which the funds were borrowed, and (d) capped the number of times debt related to one borrowing purpose could be cancelled and reissued to take advantage of lower interest rates (Clapp, 1987). Clapp also noted that the purpose of these requirements was to contain the loss of tax federal tax revenue due to the tax exemption on interest paid to lenders. All major provisions of this framework, as revised in 1986, are still in effect, with the exception that the $150 million limit on private institution debt was eliminated by the Tax Reform Act of 1996 on debt used to finance expenditures incurred after August, 1997 (Hennigan, 1998).

Kenyon (1991) documented other federal code provisions on state by state limits on the total amount of qualified tax exempt private activity debt that could be issued. Kenyon hypothesized that these limits might lead to increased use of more costly taxable debt by nonprofit organizations. However, what actually happened, according

to Kenyon, was an increase in the activity of state-level financing authorities issuing debt on behalf of non-governmental, nonprofit organizations, such as private colleges and universities. Kenyon found little evidence of a shift toward taxable debt activity.

Sanders (1992) and Buehler (1993) reported on the implications of Federal Internal Revenue Service initiatives to monitor the tax exempt debt activity of non-profit organizations more closely after passage of the 1986 federal tax law changes. According to these authors, the Internal Revenue Service was attempting to detect cases in which tax exempt borrowing was being used to promote or support otherwise taxable business activities. Buehler's analysis in particular covered revised Internal Revenue Service guidelines for auditing colleges and universities and noted how the initiative could impact requirements for an institution to document extensively its debt transactions. If audited on their debt transactions, colleges and universities would have to produce copies of all debt documents, debt project feasibility studies, bond counsel opinions, private placement memoranda, underwriter agreements, trust documents, and closing agreements. Although not directly related to assessing the implications of debt on the financial structure of colleges and universities, these works demonstrated some of the additional direct and indirect expenses institutions issuing debt could incur for violations of legal and regulatory requirements.

Alternative Representations of Debt in Institutional Finance

Debt as used in this study is a phenomenon expressed in monetary units. In order to discover how monetary concepts of debt are treated in various contexts, studies were reviewed that used a variety of perspectives to analyze and represent institutional

financial activity. This background provided a basic understanding of the language and communication of organizational financial phenomena and a foundation for identifying appropriate concepts to use in the present study of the role of debt in college and university institutional finance.

The basic accounting actions to record debt are, on the one hand, transactions to record the value of the cash received or the value of the assets purchased with the borrowed funds and, on the other hand, transactions to record the liability represented by the requirement to pay back the debt principal. Debt transactions in concept are easily confused with other related but distinct financial transactions (Anthony, 1989). Debt is an accounting and financial liability. The original liability is the total amount borrowed, not the repayment amount due each year thereafter. The total outstanding unpaid liability is reduced each accounting period by the amount of principal repaid during that period.

Due to the fact that debt must be repaid, debt does not actually create revenue or new money. It is in this sense that debt is not a source of financing. Also, debt is a liability, not an asset. Only the use or consumption of assets creates expenses. Therefore, although debt, as a liability, is reduced through periodic cash repayments of principal to the lender, these cash payments are not expenses but simply reductions in the level of the liability. Indirectly, the expense related to debt is the use or consumption of the asset that was secured by incurring debt. The only direct expenses related to debt are the interest payments, which are the expenditures required for the use of the borrowed funds. Interest expense is true expense because a reduction in an institutional asset, such as cash, is needed in order to cover the interest obligation.

Principal repayment is not expense because it is a return of borrowed funds, not the use of an organizational asset (Anthony, 1989).

The dollar amount of outstanding, unpaid debt is identified and reported on accounting reports and financial statements as of a point in time, such as at the end of an accounting month or year (Anthony, 1989). In this way, it is similar to other balance sheet (point in time) items, such as assets, because its outstanding balance amount, or status in terms of monetary units, is measured at the same point in time as other important pieces of the financial structure. Debt is one of the liabilities on a financial report or in an organization's financial records. Debt, along with other liabilities, is deducted from the total monetary value of all of the assets in the financial records to arrive at the organization's net value in monetary units as of that point. For most nonprofit organizations, such as most colleges and universities, this net or resulting financial value in monetary units at the end of a financial period (assets minus liabilities) is known as the fund balance (Johnson, 1994) and is shown in Figure 2.

Assets = Liabilities (including outstanding unpaid debt principal) + Fund Balance
or
Assets - Liabilities = Fund Balance

Figure 2. One representation of debt: The accounting equation.

If financial flows during an accounting period are positive (if incoming revenue exceeds expense), all other things being equal, fund balance will be larger at the end of the period than at the beginning. Also, an increase in liabilities normally means an equal increase in assets, all other things equal, with no change in fund balance.

The two equations in Figure 2 are one way of representing debt's role in the institutional financial structure (Massy, 1987). Without debt in the financial structure, assets defined in financial or monetary terms, such as physical facilities or a pool of student loan funds or just cash, would be offset in the equation by fund balance created, for example, from gifts, grants, endowment income, or from the net surplus of current year revenue over current expenditures.

Adding debt to the equation, however, does two things. Directly, it increases liability, or the amount of principal to be repaid. Indirectly, it increases assets by the same amount. That is, incurring debt is a liability, not an asset. However, the cash brought in as borrowed funds represents an asset. The asset is either an increase in the asset of cash itself or the use of the borrowed cash, for example, to purchase or build facilities or to create a student loan funds pool.

At the same time, even though assets increased by incurring debt, fund balance did not increase. Assets were created through the use of a liability, not due to an excess of revenue over expenditures, and not due to receipt of endowment income, grants, or gifts. This financial phenomenon of adding to assets through incurring liabilities is sometimes called financial leverage and is of major interest in understanding the role of debt in institutional financial strategy and its role in college and university financial structure (Massy, 1987; Massy, 1996).

Standard college and university financial statements and reports are the most consistent and comparable sources of detailed financial data on college and university finances across all institutions (Johnson, 1994; Wainwright, 1992). Although variation in governance and organizational patterns and individual circumstances will

affect the particular meaning of data for an institution, all college and university financial statements must be prepared in accordance with generally accepted accounting principles, as promulgated by the recognized professional accounting standard-setting bodies. These are the Financial Accounting Standards Board for private institutions and the Governmental Accounting Standards Board for public institutions (Wainwright).

In addition, virtually all institutions' official financial statements for a given period are not released as final until reviewed and certified by an independent audit. The National Center for Education Statistics requires institutional responses to the annual Finance Surveys of the Integrated Postsecondary Education Data System to be based on institutional financial statements (Broyles, 1995), and responses to these Finance Surveys were the source of data for the present study.

Because the data used in this study were based indirectly on college and university financial statements, critiques of the limitations of these statements and any recent changes in the professional guideline accounting principles used as the basis for preparing standard financial reports were considered. In reference to data in public college and university financial statements, Johnson (1994) cautioned that the states vary in how their public institutions or systems of institutions measure and report financial activity related to facilities, debt, auxiliary enterprises, endowments, affiliated foundations, and state appropriations. Even among private institutions, data always may not be comparable because of variations in how institutions manage and report the financial activity of endowments and foundations versus the core institution's financial entity (Johnson).

Winston (1992) pointed out the limitations of college and university accounting statements for analyzing what he referred to as the full scope of economic activity within an institution, particularly in the area of physical plant asset value. Estes and Murphey (1996) evaluated college and university financial statements from the point of view of lenders accustomed to reviewing for-profit financial statements for credit worthiness. They stressed that, historically, nonprofit statements were unconsolidated clusters of separate statements, with divisions based on differing sources of revenue and their uses. They also noted, however, that recent developments in generally accepted accounting principles point toward more integration and bring nonprofit reporting closer to for-profit standards in areas such as depreciation accounting, which distributes the cost of building construction and large equipment purchases over the useful life span of the building or the equipment.

Wambsganss and Olson (1988) and Patten and Wambsganss (1991) reviewed traditional accounting standards and their implications for the reporting of long term assets by colleges and universities. Augustine and Turner (1996), on the other hand, analyzed some of the major changes and trends in accounting and reporting standards in the 1990s for private colleges and universities, whereas this topic was covered in Governmental Accounting Standards Board (1997) for public colleges and universities.

Although college and university financial reporting practices continue to evolve, various data items from standard financial reports and financial statements are used in practice to evaluate financial condition for internal management purposes and for the purpose of external independent evaluation, such as establishing credit ratings for long term debt (KPMG Peat Marwick, 1995). Individual financial data items for these

assessments are not viewed in isolation. Rather, individual items are compared to other items in order to standardize them and give them a context reference.

This practice is sometimes referred to as comparative analysis or financial ratio analysis and has become standard practice for developing meaning from raw reported financial data for the purposes of college and university financial assessment and financial management analysis (Chabotar, 1989; Johnson, 1994; KPMG Peat Marwick, 1995). National financial services rating organizations, such as Standard and Poor's, Moody's Investors Service, and Fitch, develop and publish credit ratings on the credit worthiness of for-profit and nonprofit organizations. Each rating organization has credit rating guidelines and rating scales specifically tailored to American colleges and universities. These rating systems to a large extent are based on financial ratios appropriate to a higher education institutional setting, but they also incorporate a number of less quantitative factors ("New Financial Accounting Ratios," 1997; Fitch IBCA, 1998a, 1998b).

Two ratios from this literature were adapted for the present study to support analysis of reported institutional debt. The two ratios used in the present study are total current revenue in relation to the sum of current debt interest expenses and debt principal repayment obligations, and a financial leverage ratio--long term debt divided by the sum of long term debt and fund balance (Chabotar, 1989; KPMG Peat Marwick, 1995).

The financial data critiques and reports of recent developments in college and university financial reporting summarized above suggest that the reported financial data used in this study had some limitations. All institutional economic activity was

not reported in the core financial statements used for Federal Integrated Postsecondary Education Data System reporting. Physical plant asset values for public institutions, and until recently for private institutions, was for the most part not reported net of depreciation expense. In many cases public college and university facilities debt obligations were recorded as obligations of state governments rather than the institutions themselves.

Balanced against these concerns is the fact that virtually all colleges and universities regularly prepared financial statements according to nationally recognized generally accepted accounting principles. Virtually all institutions reported certain standard financial data based on these financial statements through the annual Integrated Postsecondary Education Data System Finance Survey in response to standard instructions and reporting guidelines. Consistent with the practice of ratio analysis for institutional strategic analysis and for external evaluation of credit worthiness, I used standard, debt-related financial comparisons for measurement, tracking, and analysis-over-time as a basis for studying the role of long term debt in college and university financial structure.

From the broader perspective of debt's role in organizational finance, there were alternative conceptions in the literature of how to treat debt in financial analysis and planning. Okoruwa, Cox, and Thompson (1994) reviewed how debt is treated for capital budgeting analysis from the disciplinary perspectives of accounting, finance, and real estate and concluded that debt's cost and effect on cash flow is handled three different ways by these disciplines, leading to different conclusions on debt's effect on capital budgeting decisions.

Dunn (1989a, 1989b), Hornfischer (1996), and Massy (1987, 1996) discussed debt in the context of college and university institutional financial strategy. Each recommended a somewhat different approach to linking financial planning with strategies for capital facilities acquisition and maintenance. Of the three, Dunn elaborated in greatest detail and recommended dividing facilities costs into three categories: (a) new facilities, (b) facilities renewal for adaptation to program requirements, and (c) facilities maintenance. Dunn argued that financing must be identified independently for each category, in order to match appropriate sources of financing with specific needs and the useful life of each type of asset. However, he did not present a precise blue print for determining how debt might or might not be appropriate for each category, and he confused the presentation by designating depreciation expense as a source of funding rather than recognizing it as a means of determining net financial position by recording the cost of a long term asset against revenue on a period by period basis as the economic value of the asset expires.

Hornfischer (1996) discussed guidelines for assessing debt capacity at the institutional level in terms of actual and projected outstanding unpaid debt. To make this evaluation, he recommended comparing actual and anticipated debt level in relation to the value of endowment funds and calculating annual cash outlay requirements for principal and interest payments as a percentage of total budgeted cash outlays. Hornfischer's perspective on institutional debt thus moved to a broader view of financial strategy than Dunn (1989a, 1989b). However, Hornfischer implied that there should be some ideal ratios of debt to endowment, and debt service to total expenditures, without examining how institutions of similar characteristics actually

vary on these comparisons or if changing circumstances over time might suggest variations from the ideal target ratios.

Like Hornfischer (1996), Massy (1987, 1996) jointly considered the roles of endowment, debt, and current operating revenues versus expenditures in his representation of institutional finance as a process of long term, strategic decision making. Massy's approach, however, was more comprehensive than Hornfischer's. Massy included the role of current operating support from endowment income, how this income would be affected if funds for facilities construction were borrowed from endowment rather than borrowed externally as debt, and how an institution can consider creating a pool of funds through debt for project financing rather than seek debt funding individually on a project by project basis. Massy also went further than Hornfischer by recognizing the reduction in internal financing flexibility related to restricted versus unrestricted endowment. Like Dunn (1989a, 1989b), however, Massy confused the analysis by designating debt a source of capital without clearly qualifying it by recognizing that debt actually is a liability that must be discharged by assigning some real source of cash funds for repayment.

Together the works of Dunn (1989a, 1989b), Hornfischer (1996), and Massy (1987, 1996) provided good background related to the goals of the present study because they represented institutional financial activity as an interplay of several elements and pointed out how these affect debt management strategy from different perspectives, such as endowment size in relation to the size of debt service requirements. These authors, however, did not present tools for analyzing changes in financial relationships over time and for identifying whether there may be correlation

in actual practice between amount of unpaid debt, measures of financial leverage, and other key financial variables.

The Role of Debt in Financial Structure

Debt is not a source of funds but a mechanism that enables the institution to secure the use of assets to achieve missions and program objectives in anticipation of future revenue streams. These anticipated revenues, when they become actual, later are used as the source of funds to purchase the asset, as represented by debt service principal and interest payments. Using a liability rather than current reserves to secure additional assets is known as financial leverage. Through this mechanism the organization is able to achieve an increase in physical assets or an increase in financial assets without an immediate contribution from a source of funds (Weston & Brigham, 1981; Ross & Westerfield, 1988). This strategy is one potential way for a college or university to secure the assets needed to maintain or increase service capacity. However, taking on debt for the first time or increasing debt changes the financial structure of the institution and may increase financial risk.

Financial structure refers to the dollar value of each of the various claims, liabilities, obligations, or other offsets to the organization's assets as of a point in time (Weston & Brigham, 1981; Ross & Westerfield, 1988). Financial structure for a particular organization is what makes up the right side of its accounting equation.

Assets = Liabilities (including outstanding unpaid debt principal) + Fund Balance

Examples of financial sources are net unobligated revenue surpluses from operations (fund balance), debt, and other outstanding liabilities, such as accounts payable and short term loans payable. The logic of the accounting equation makes clear that introducing debt or increasing debt changes financial structure. Adding an asset, which the borrowed funds are used to purchase, increases total assets, while adding debt increases total sources of support. Rather than an exchange of one asset for another (for example, cash payment for equipment), debt enables an increase in assets without immediately giving up other assets. Financial leverage (the use of debt) keeps the equation in balance and occurs because total assets increase without drawing on surplus (fund balance) due to gifts, grants, and operations.

A basic measure of financial leverage at a given time is the ratio of the dollar value of total outstanding debt divided by the dollar value of total assets (Weston & Brigham, 1981; Ross & Westerfield, 1988). Restated in different terms, this is the same as the ratio of debt divided by debt plus fund balance, because assets equal debt plus fund balance.

Regardless of which form it is presented in, this key ratio also points out that it is not the amount of debt that is important but amount of debt in relation to other key financial variables. This leads to the proposition that different colleges and universities may be compared in terms of the degree of financial leverage in their financial structures even though they may vary considerably in terms of size, mission, and amount of outstanding long term debt. Financial leverage is based on the size of one variable in relation to others rather than on the absolute value of any one variable.

Practically any entity faces some operating risk, even without debt. Risk comes in the form of making commitments to meet expenses over a given period without knowing for certain, in many cases, what the level of actual revenue will be over the same period. A possible shortfall in actual versus anticipated revenue means running the risk of not being able to meet all expenditure commitments.

Debt adds financial risk to regular operating risk (Weston & Brigham, 1981; Ross & Westerfield, 1988). With debt comes a new or increased fixed level of expenditure in the form of obligations for principal repayment and interest expense. According to Forrester (1988), certain conditions will increase pressure on a college or university to commit to debt or add to existing debt, thus increasing financial risk--multiple internal organization units acting as semi-independent financial entities, enrollment fluctuation, real or imagined needs to expand physical facilities, fund raising uncertainties, and instability in governance or in internal management and politics. The potential benefits of financial leverage are attractive, but borrowing funds in anticipation of continuing or increasing future revenue streams brings additional operating and financial risk to the college or university.

Researchers in financial strategy and the financing of capital expenditures in higher education frequently did not distinguish clearly between the concepts of financial capital and physical capital (Massy, 1987, 1996; Winston, 1992, 1993). The blurring of these concepts resulted in some cases in confusion over the role played by debt financing in adding to or enhancing college and university capital facilities (Robinson, 1986).

Financial capital is the historical cost (price paid for) either a physical or financial asset measured in terms of dollars. An organization maintains its financial capital if revenue covers the cost of all assets acquired with operating resources, including an allowance for the total cost of a long term asset spread over it useful life (Robinson; Anthony, 1989).

Physical capital, on the other hand, represents production or service capacity, which is a physical quality, not a financial attribute (Robinson, 1986). Physical capital is maintained if the institution has, or somehow can acquire, the facilities, equipment, and other long term assets needed to meet current program and service requirements. Indeed, funds from some source usually are required to purchase the necessary or desired level of physical capital and service capacity. The financial resources to do this might be surpluses from current operations, debt to be repaid from future revenues, or other sources. However, physical capital is a separate concept from financial capital. Debt service payments discharge outstanding debt. They do not provide a fund for asset acquisition (Anthony, 1989).

The present study addressed the impact on financial structure of debt financing of assets. This was not a study of financial capital maintenance or physical capital maintenance, although debt is related to both of these concepts. Rather, debt by itself is an important topic in higher education institutional finance because debt creates or adds to financial leverage, which gives an institution the ability to increase assets without immediately reducing other financial assets. Debt also is important because debt may increase institutional financial risk.

There was no consensus in the financial economics literature on a single theoretical approach that explained or predicted the amount of long term debt incurred by profit-seeking or nonprofit organizations (Barclay & Smith, 1995; Mizruchi & Stearns, 1994; Myers, 1984; Wedig, Hassan, & Morrisey, 1996). Much of the financial economics literature on this topic was based on the following propositions. Organizational financial strategists typically try to achieve some approximate target ratio of debt to other sources of financing. An organization usually seeks long term debt only after other forms of financing have been established. Decision makers use debt only up to some level that will protect the organization from excess financial risk and that will conserve some margin of additional debt capacity (Myers). Forrester (1988) cautioned college and university administrators that debt capacity is a finite resource and that incurring debt or adding more debt uses up an implied reserve of capital that becomes more costly the more it is used. With more debt, borrowing becomes more costly due to poorer credit ratings, which results in higher interest charges.

The present study drew on selected conceptual assumptions on debt financing from literature on the economics of finance. Some of the data analysis methods presented in this literature were adapted and applied to the higher education institutional setting in order to develop a better understanding of the use of debt financing in college and university institutional finance from the late 1980s through the mid 1990s.

Alternative Conceptual Frameworks

College and university officials do not incur long term debt as an isolated exercise in financial and accounting mechanics. They issue debt for a reason or in response to some condition or set of conditions. A review of the literature has indicated that debt is incurred both because of a need to secure funds for long-life investments and because it is one of several financing options that may be preferred under some circumstances.

Any conceptual framework used for a study of higher education institutional debt from the late 1980s through mid 1990s must be relevant to the general external and internal economic and financial problems and issues faced by colleges and universities at that time (Roherty, 1997; Breneman & Finney, 1997). In the external environment, higher education's share of state government support for all services, expressed as a percentage of state general fund spending, declined throughout the nation from about 16% in the late 1980s to about 12% by the mid 1990s. The federal government's share of all financial aid to students dropped by approximately 5% during the same period. By the mid 1990s, tuition and fees at all institutions in total came to exceed the total amount of revenue received from all governmental sources. For all public institutions, fund raising from private sources as a percentage of total annual revenue increased by over 50% from the mid 1980s to the mid 1990s. On the whole, the extent of these shifts in sources of funding for colleges and universities suggested to many observers a fundamental and evolving structural change in the role of public support for public and private higher education (Roherty; Breneman & Finney).

Within many colleges and universities in the 1990s, internal operational financial planning and budgeting did not keep pace with macro level strategic planning and its emphasis on organizational and programmatic realignment (Brinkman & Morgan, 1997):

1. Details for implementing specific measures to meet continuing pressures to reduce and contain costs often were not addressed in strategy development and planning (National Commission on the Cost of Higher Education, 1998).

2. Higher education decision makers frequently focused on revenue identification and revenue enhancement strategies rather than the strategic aspects of financial planning and decision making (Bowen, 1980; Brinkman & Morgan, 1997; Geiger, 1986; Tolbert, 1985).

3. Many institutions continued to function as clusters of decentralized, semi-autonomous financial units without a comprehensive financial planning and budgeting framework (Whalen, 1991; Zemsky & Massy, 1995).

4. Fiscal stringency and reallocation were prevalent themes through the mid 1990s in spite of generally positive state and national economic trends and restoration of some state support to public institutions reduced during the economic recession of the early 1990s (Breneman & Finney, 1997).

5. Marginal and incremental analysis rather than comprehensive financial review and planning prevailed as college and university managers and institutional policy makers balanced multiplying financial demands against limited resources (Brinkman & Morgan, 1997).

The present study systematically analyzes factors relating to actual levels of debt reported by colleges and universities. This study may be an example of some of the "deeper second- and third-order probing" that is needed to increase our understanding of the necessary, but as yet only vaguely identified, links between planning and budgeting (Brinkman & Morgan, 1997).

Various conceptual frameworks have been used to study specific topics in college and university finance. Tolbert (1985) studied institutional revenue sources as related to the number of administrative personnel engaged in fund raising and governmental relations in private and in public institutions. Geiger (1986), on the other hand, only studied private institutions and looked for relationships between revenue sources and institutional mission. Tolbert surveyed 167 public institutions and 114 private institutions in the United States. She found that the public institutions had substantially more professional and managerial personnel in governmental relations and planning, public information, and institutional research than in fund raising and admissions. The private institutions devoted more personnel to development, alumni relations, and admissions than to planning, public information, and institutional research. According to Tolbert, these findings were explained by public institutional finance's greater reliance on governmental revenue sources and therefore the need for public institution officials to maintain government contacts and place a relatively greater emphasis on public relations and public information. Tolbert concluded that the relatively higher number of personnel in fund raising and admissions in independent institutions was explained by these institutions' relatively heavier reliance on tuition charges and voluntary giving as fund sources.

Based on a study of private institutional missions and fund sources, Geiger (1986) concluded that private urban universities relied on a balanced mix of tuition, private donations, and research grants for revenue support; that private liberal arts colleges relied primarily on a mix of tuition charges and private donations; and that private research universities depended most heavily on research grants in addition to private donations and tuition.

The Geiger (1986) and Tolbert (1985) studies thus suggested one potential way of framing a study of college and university debt. An external resource dependence approach might assume that debt levels are related to the type and degree of institutional external resource dependence, identify variables indicating resource dependence, and compare debt level to degree of resource dependence to determine if there was a relationship.

As institutional decision makers consider the possibility of debt financing and make determinations on whether or not to borrow funds, one of the most important considerations is the institution's standing credit rating and the potential individual debt issue rating that might be assigned by financial services industry rating organizations. The credit rating is critical because it is one of the primary elements used to establish the interest rate on the debt, and the interest expense is the major component of the cost of borrowing funds (King et al., 1994). The higher the institution's credit rating, the lower its interest expense obligation. Faced with declining state appropriation support relative to other fund sources, financially sophisticated, well-endowed public institutions during the period under study increasingly gave the highest level of

attention to the potential impact of budgeting and financial decisions on the institution's credit rating (Sandridge, 1998).

Another framework, therefore, for viewing changing debt levels at the institutional level could be to assess those factors used by the major private rating organizations to establish and adjust college and university credit ratings and ratings on individual debt issues (Klein, 1992; "Standard and Poor's Private," 1997). Typical credit rating factors include enrollment competition and selectivity, competitive position in the institution's market segment, revenue diversity and flexibility, and financial ratio analysis, with specific rating factors varying somewhat for private versus public institutions (Fitch IBCA, 1998a, 1998b). This conceptual framework would suggest an examination of whether credit ratings, changes in ratings over time, and changes in institutional performance on factors considered in the ratings all may have had some influence on how much debt an institution incurred.

The focus of the present study was on debt's role in the financial structure of higher education institutions. Institutional finance deals with knowledge about an institution in terms of the dollar value of resources that have been brought to bear in support of institutional goals, programs, and activities. In line with these conditions, economic analysis is another framework that provides concepts and tools to relate the cost of resources to institutional goals and output (Hoenack & Collins, 1990).

Colleges and universities for the most part are nonprofit organizations. Economic analysis terms and concepts particularly related to nonprofit enterprises must be used in any economic analysis framework used for a study of higher education finance. For

example, officers of nonprofit organizations legally cannot distribute net surpluses of revenue over expenditures, either to internal managers or to outside parties.

There are no external owners of the nonprofit enterprise similar to the stockholders of for-profit operations. However, from one point of view, gifts and donations to nonprofit organizations, in effect, substitute for the financial capital provided by stockholders in for-profit corporations (Hansmann, 1987). Stockholders and internal managers of for-profit organizations have, as at least one major goal, an increase over time in the net financial value of the organization. Donors to nonprofit organizations, on the other hand, and internal managers expect the nonprofit enterprise to maintain and enhance value by accomplishing the institution's goals and objectives.

In economic terms, therefore, issuing long term debt plays a similar role in both the for-profit and nonprofit organization. Both organizations use the financial features of debt to anticipate future period revenue, placing it into the service and support of current production activities aimed at achieving organizational missions and goals.

From an economic standpoint, therefore, the major sources of capital for the nonprofit enterprise are donations and surpluses of operating revenue over expenditures. As in for-profit organizations, economic analysis provides one way of understanding the financial mechanism of debt in terms of its costs in relation to its benefits (Hansmann, 1987).

Researchers (Fama & Jensen, 1983, 1985; Jensen & Meckling, 1976) in the field of the economics of finance developed and tested a theoretical framework that views financial providers, such as donors, stockholders, and lenders, as principals in a principal-agent relationship with organization directors and managers. The latter, as

agents, are responsible for the proper management and application of the funds provided by principals. This model included the assumption that principals and agents have different points of view, motivations, and goals. This divergence gives rise to a clash of interests mediated by the interplay of costs and benefits that each party assigns to the principal-agent partnership.

Fama and Jensen (1983, 1985) and Jensen and Meckling (1976) interpreted data such as actual level of borrowed funds, for example, in terms of each party's desire to attain maximum benefits at the least cost. This theory proposed, therefore, that both for-profit and nonprofit enterprises seek to achieve and periodically adjust organizational financial structures to maintain the largest possible positive difference between the benefits and costs of various sources of financing, including donations, debt, surplus from operations, and other sources.

Decision makers in colleges and universities, therefore, have two primary sources for maintaining and increasing financial value: surplus from operations and donations (including government appropriations). In addition, long term debt as a financial mechanism is available, at a cost, for leveraging the productive capacity of existing assets and anticipated future surpluses from operations.

This theoretical outline from the economics of finance could provide a reference point for inquiry into relationships between debt level and other financial variables. Appropriate areas for analysis would be (a) whether institutional debt levels vary with changes in asset levels, (b) whether debt levels change in relation to changes in revenue, and (c) whether degree of financial leverage is related only to debt level or also to other key financial variables.

The economics of finance model provided a frame of reference for the present study for interpreting relationships between various financial variables and offered some basis for explaining variation in debt levels as functions of other key financial variables. At the same time, judgements on the cost versus the benefit of alternative sources of financing are likely to be quite institution-specific based on individual circumstances. If this is the case, it could explain why there might be varying patterns of debt and different relationships among relevant variables among institutions of different sizes and missions.

The relationships highlighted by the economics of finance model are adaptable for examining a number of different questions related to debt in both for-profit and nonprofit organizations. Mizruchi and Stearns (1994) studied the level of outstanding debt in 22 business corporations over a period of 26 years by using both qualitative and quantitative independent variables. Qualitative variables included the professional background of members of boards of directors and whether or not the chief executive officer had professional training in financial management. Quantitative predictors included annual differences between revenues and expenditures retained in the business and expected financial return on borrowed funds, defined as the difference between the interest rate for borrowing and the business's overall growth and profit trend.

Kim and Maksimovic (1990) found that restrictions accompanying debt, such as collateral agreements on disposition of assets, reduced the flexibility with which managers used these assets. This, they suggested, could lead to a less than completely efficient use of these assets in achieving organizational objectives. Harris and Raviv (1990) extended the basic cost and benefit propositions surrounding debt in the

financial economics model to suggest that debt functions as a communications device about the organization to external financial and non-financial stakeholders. On the positive side, in their view, the existence of some debt and a good credit rating communicates that the enterprise is financially healthy enough to meet fixed contractual financial obligations. On the down side, a poor credit rating or default on debt service payments will suggest to potential donors, stakeholders, and other principal suppliers of resources that the organization is either poorly managed or represents a poor risk in terms of expected payoff from additional external support.

Wedig (1994) applied financial economics analysis to a study of debt in nonprofit enterprises using hospital data. Wedig used regression analysis to test hypotheses on the relationship between annual change in net revenue surplus and annual change in debt levels and fixed assets in 117 nonprofit hospitals over five years. Wedig found a positive relationship between change in annual net operating revenue and the ratio of debt to fixed assets, which is one measure of financial leverage. This result suggested that as the debt to assets ratio increased, and therefore as leverage and risk increased, decision makers in nonprofit hospitals were more reluctant to pursue further investments and spending. This conclusion was based on the fact that the organizations under study reported larger surpluses and fund balances as leverage increased, rather than use these surpluses for additional long term investment.

Wedig, Hassan, and Morrisey (1996), on the other hand, collected data on 155 nonprofit hospitals over five years, treated changes in outstanding debt and expenditures on long term physical assets as dependent variables, and compared changes in these variables to annual deviations from average debt levels and average

financial capital levels over the whole time period. They hypothesized that policy decisions on appropriate debt levels in nonprofit organizations are, in part, a response to departures from ideal average debt levels over time. These researchers reported a positive, time-lagged relationship between deviations from average debt levels for all years under study and actions to increase or decrease long term borrowing levels.

This review of applications of the economics of finance model to studies of long term debt indicated that it could provide an appropriate window through which to view the role of debt in institutions of higher education and to explore related research questions. This framework casts organizational financial activity against the constructs of economic cost benefit analysis and thus provides a set of related theoretical constructs. Its economic assumptions provide links to reasonable propositions dealing with interrelationships among relevant financial variables. Changes in levels of variables represent the results of decisions made to pursue benefits or gains and to avoid costs or hold them to a minimum.

For the present study this framework enabled an identification and measurement of relevant phenomena, such as debt levels and debt in relation to other financial variables, that could be analyzed in relation to each other and in relation to the propositions and concepts offered by financial economics theory. This framework supported achievement of the goals of this study, which were to analyze the reported long term debt levels of four-year colleges and universities in the United States from the late 1980s to the mid 1990s, to examine whether financial leverage due to long term debt changed over this period at the institutional level, and to assess whether there

were relationships during this period between changes in the level of institutional long term debt and changes in other key financial variables.

Chapter 3 - Procedures

Conceptual Framework

For this study the amount of outstanding, institutional level long term debt in colleges and universities was viewed in relation to other financial and economic variables in the context of a theoretical model of nonprofit enterprise economic and financial activity presented by Hansmann (1987) and Wedig (Wedig, 1994; Wedig et al., 1996). Drawing from these studies, the working principles and assumptions for the research were as follows:

1. In making financial, investment, and resource allocation choices, college and university decision makers, as managers of nonprofit enterprises, consider and balance risk, cost, and contribution to achievement of organization mission and goals.

2. Financial capital in the college and university is derived either from surplus from operations or from contributions from private or governmental sources. Debt is not a direct form of capital but a financial mechanism for accelerating receipt of economic benefits from future anticipated capital. Financial leverage due to long term debt is the percentage of organizational assets measured in dollars financed by long term debt. This percentage is measured by comparing the amount of outstanding long term debt to the sum of long term debt plus accumulated fund balance supported by surplus from operations and from contributions from outside sources.

3. The financial value of a nonprofit organization's assets and the financial value of debt, surplus from operations, and outside sources of capital are reported in the nonprofit organization's financial reports and statements. The relationships among them are represented by the basic accounting model of the nonprofit enterprise.

Assets = Liabilities (including outstanding unpaid debt principal) + Fund Balance

4. Business risk is present in the nonprofit organization, including colleges and universities, in the form of operating risk and financial risk. Both forms of risk are present because of the uncertainty of the timing and amount of incoming capital. Operating risk relates to the ability of managers to cover current operating expenditures from current revenues, whereas financial risk is the additional risk from incurring debt and its fixed interest expense and principal payments.

In relation to explaining and predicting the amount of outstanding unpaid long term debt in nonprofit organizations, these theoretical principles suggest that decision makers are reluctant to increase business risk to achieve organizational purposes because of the uncertain nature of future incoming capital flow. Institutional officers, however, will add to risk intentionally by incurring debt if the expected economic benefits and enhanced ability to achieve organizational purposes from increased financial leverage outweigh the anticipated costs.

Research Questions

The time frame of this study was from the late 1980s through the mid 1990s. The focus of interest was the role of debt in the financial structure of institutions of higher education. Debt-issuing activity in institutions of higher education increased from the

late 1980s through the mid 1990s (Hennigan, 1998). Needs for new long term investment in physical facilities and facility repair and renewal grew during the period (Kaiser, 1996). Public support in the form of governmental contributions to higher education tapered off, competition increased among colleges and universities for students and for financial resources, and external expectations and mandates increased for program results and accountability (Breneman & Finney, 1997; Layzell & Caruthers, 1995; Nedwek, 1996). These conditions suggested the following research questions in regard to the relative importance of long term debt in college and university institutional finance during this period:

1. Did the mean amount of unliquidated long term debt reported by all four-year colleges and universities change during this period, and were trends in these changes similar for private and public institutions and for institutions of differing sizes and missions?

2. Did the mean amount of reported outstanding long term debt among colleges and universities change during this period after the effect of adjustments in general price level is accounted for?

3. During this period, did the mean amount of outstanding unpaid long term debt at the institutional level change in proportion to change in the level of institutional long term fixed asset investment or did the level of long term debt change at a greater or lesser rate?

4. Did the degree of financial leverage through the use of long term debt at the institutional level change for colleges and universities during this period?

5. Were changes in the level of outstanding institutional long term debt and the degree of institutional financial leverage due to long term debt during this period related to changes in general institutional financial activity?

Method

The theory of the role of debt in nonprofit organizations outlined by Hansmann (1987) and applied by Wedig (Wedig, 1994; Wedig et al., 1996) was the conceptual framework for an exploration of the research questions. Data on the financial variables of interest at the institutional level are reported in standard, periodic institutional financial reports and financial statements. These statements include information on outstanding level of unliquidated long term debt, dollar value of long term physical assets, the general level of financial activity for the reporting period, such as total revenue, and the net accumulated value of the capital contribution to the enterprise in the form of surplus, or fund balance, from operations and from contributions from external supporters and sponsors, including governmental appropriations and grants.

Level of Data Collection and Analysis. The focus of this study was on the amount of outstanding unpaid college and university debt at the level of the individual institution as a whole. Therefore, reported financial data aggregated at the institutional level were used rather than data from separate academic and administrative units within an institution. Also, the data source used for the research represented financial data on an institution by institution basis rather than, for example, average relationships across an entire statewide system of public institutions. For describing and interpreting the findings, data were summarized from the institutional level into institutional categories

using the Carnegie Foundation for the Advancement of Teaching institutional classification (Carnegie Foundation for the Advancement of Teaching, 1994).

Time Frame. The research questions for this study relate to amounts of outstanding long term debt in colleges and universities and amounts of unpaid debt relative to other financial variables and whether these changed from the late 1980s through the mid 1990s. By consensus, this was a period of financial resource constraint and changing financial dynamics in colleges and universities. Institutional level data on long term debt and other financial variables relevant to the study were collected and analyzed for each of eight annual fiscal year reporting periods, 1988-89 through 1995-96.

Data Collection. Institutional level source data for this study were extracted from the 1988-89 through 1995-96 annual automated data base files of the Integrated Postsecondary Education Data System, which was constructed and is maintained by the National Center for Education Statistics (Broyles, 1995). One segment of each annual Integrated Postsecondary Education Data System data base included data from the annual Integrated Postsecondary Education Data System Finance Survey of all higher education institutions in the United States.

Among the advantages to this approach to data collection were that, except for some missing responses for individual institutions, the data covered practically all institutions in the target population, which is all four-year colleges and universities in the United States. Annual data were available by institution for all years under consideration. Although there have been some changes in the content of the annual

Finance Survey over time, data collection procedures and individual data category definitions were quite consistent from year to year during this period, as shown by an inspection of each year's Finance Survey questionnaire and instructions (Broyles, 1995; U.S. Department of Education, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996). Due to the fact that data relevant to this study were available, I avoided the additional time and potential problems involved in developing and testing a new, reliable data collection instrument and avoided the potential practical problem of low response rate to an additional request for the same data.

Drawbacks to using the Integrated Postsecondary Education Data System Finance Survey data include the fact that they are self-reported. This may result in missing data, variation in respondents' interpretations of how to complete the survey, and inconsistency in response from different institutions and from the same institution from year to year. Another disadvantage is that colleges and universities are to report the Integrated Postsecondary Education Data System Finance Survey data using information from standard annual institutional financial statements prepared on the basis of generally accepted financial accounting principles for nonprofit organizations, as modified for private and for public institutions of higher education.

Standard financial accounting and reporting principles in higher education have been criticized for not incorporating the full economic value and flow of all financial resources and activity (Winston, 1992). Also, there are differences in generally accepted accounting and reporting principles applicable to private institutions versus public institutions (Augustine & Turner, 1996; Johnson & Bean, 1997). Generally accepted financial accounting principles, however, are the only reasonably consistent

nationwide set of standards by which college and university financial reports are prepared and audited. Therefore, the data derived from them for preparing institutional responses to the Integrated Postsecondary Education Data System Finance Survey generally should be consistent among institutions in the same year and from year to year.

Institutional level data were collected by downloading each annual Integrated Postsecondary Education Data System Finance Survey data file for the years 1988-89 through 1995-96 in .dat format from the National Center for Education Statistics world wide web site (http://nces.ed.gov/ipeds). Within each annual Finance data file, institutional responses are organized into sub-files by Finance Survey section: (a) institutional characteristics, (b) revenue, (c) indebtedness on physical plant, (d) endowment assets, (e) fund balances, and (f) physical plant assets. Responses are associated with the responding college or university by a unique institutional Integrated Postsecondary Education Data System identification number (Broyles, 1995).

Responses on the variables of interest were extracted from the annual Integrated Postsecondary Education Data System sub-files into Microsoft Excel files using the Excel Import function. The data base creation feature of Microsoft Access was used to combine the individual Excel files, representing institutional responses from the separate Finance Survey sections, into eight annual files with responses by institution by year on all variables of interest.

Each institutional record on all variables of interest for each year was created by matching responses in each sub-file on the Integrated Postsecondary Education Data System unique institutional identification number. The Microsoft Access-based annual

files were loaded into Microsoft Excel to compute descriptive statistics. For correlation and regression analysis on all years' data combined using Statistical Package for the Social Sciences program software, another set of Microsoft Excel files was created by combining the eight separate sets of Excel files and then converting these files to Statistical Package for the Social Sciences file format.

Two Integrated Postsecondary Education Data System institutional attribute variables were used to limit the population to four-year institutions and to analyze the data by private institutions versus public institutions and by Carnegie institutional classification. These grouping variables were Integrated Postsecondary Education Data System sector code and Carnegie classification code. Institutional data for all years were grouped according to the values assigned to these variables in the 1995-96 Integrated Postsecondary Education Data System file.

Data Treatment. For all variables measured in dollars, an estimated average effect of general price inflation over the period was factored out by using an inflation index to transform the data for each year after 1988-89 into the dollar equivalent of 1988-89. One general price index applicable to goods and services purchased by colleges and universities in the United States is the Higher Education Price Index (Research Associates of Washington, 1998), which compares prices paid for a variety of typical higher education purchases from one year to the next. Table 1 lists the Higher Education Price Index adjustment factors for the years covered by this study and shows an example of how the factors were used in this study to convert reported amounts to the equivalent of constant 1988-89 dollars.

Table 1
The Higher Education Price Index and An Example of Application

Year	Higher Education Price Index Annual Inflation Assumption	Higher Education Price Index with 1988-89 = 100.0	Hypothetical Unadjusted Amount	Adjusted Amount Using the Index (Divide the Year's Unadjusted Amount by the Year's Index Number)
1988-89	n/a	1.000	$78,000	$78,000
1989-90	6.02%	1.060	$89,000	$83,962
1990-91	5.26%	1.116	$97,000	$86,918
1991-92	3.58%	1.156	$115,000	$99,481
1992-93	2.93%	1.190	$128,000	$107,563
1993-94	3.35%	1.230	$143,000	$116,260
1994-95	3.06%	1.267	$162,000	$127,861
1995-96	2.97%	1.305	$185,000	$141,762

This price change adjustment was important for this study because changes in variables over time measured in current reported dollar amounts were analyzed and compared, yet price change was not a predictor variable of interest. Therefore, the price change adjustment controlled for the effect of estimated general price level change over the period under consideration.

Variables. The conceptual framework of the financial structure of the nonprofit organization, together with research questions focusing on change in the financial structure of higher education institutions in the 1990s, provided a rationale for a study of the relationship at the institutional level between four predictor variables (see Figure 3) and two debt-related criterion variables (see Figure 4).

Predictor Variables
• Value of buildings and equipment
• Annual revenue
• Value of endowment assets
• Years 1988-89 through 1995-96

Figure 3. Predictor variables.

Predictor Variables

VALUE OF BUILDINGS AND EQUIPMENT

Much of the literature on higher education long term debt viewed the need for debt in the context of institutional requirements for long-life physical assets, such as buildings and equipment (Dunn, 1989b; Hennigan, 1998; Kaiser, 1996; King et al., 1994; Libby, 1984; Sturtz, 1990). In order to study the relationship between physical asset levels and levels of long term debt, annual year-end estimated replacement value of buildings and equipment by institution was extracted from the annual Integrated Postsecondary Education Data System Finance Survey files. Data elements from the Integrated Postsecondary Education Data System files used to operationalize this variable were "current replacement value - buildings" and "current replacement value - equipment," and their sum was used as one variable.

GENERAL INSTITUTIONAL FINANCIAL ACTIVITY

Hornfischer (1996), Massy (1987, 1996), and Robinson (1986) explored the role of long term debt in colleges and universities not so much as a means to the end of

increasing investment in long term physical assets but as one of several possible financial mechanisms to consider in long term financial planning. This also was the point of view of the financial ratio analysis literature (Chabotar, 1989; Fitch, 1998a, 1998b; KPMG Peat Marwick, 1995) as applied to assessing institutional debt. Debt was not analyzed in isolation or solely as an instrument for acquiring physical assets but in relation to other financial indicators.

Two predictor variables representing general financial activity were used in this study. These were the reported level of annual revenue and the reported year-end value of endowment assets. These variables are reported by colleges and universities in the Integrated Postsecondary Education Data System Finance Survey as the data elements "total current funds revenue" and "market value of endowment assets."

TIME

Wedig (Wedig, 1994; Wedig et al., 1996) noted that managers of nonprofit organizations are averse to risk because of the uncertainty of future revenue flow to their organizations. However, he argued that under certain conditions decision makers in nonprofit organizations intentionally will elevate the level of the organization's financial risk by increasing debt relative to surplus from operations. He believed they will do this, even when faced with increasingly scarce financial resources, if investment opportunities related to organization mission present themselves.

From 1988-89 through 1995-96, colleges and universities experienced what some analysts called a fundamental shift in their financial environment (Breneman & Finney, 1997; Brinkman & Morgan, 1997; Roherty, 1997). Private institutions struggled to

maintain affordability by limiting tuition increases and increasing endowment. Public institutions experienced increasing limitations on public sources of support and increased their private fund raising efforts. Governmental bodies at the state and federal levels increased pressures for linking public funding for higher education to measurable performance, accountability and control (Carter, 1994; Layzell & Caruthers, 1995; Nedwek, 1996). Therefore, variation in the criterion variables over the period under study, with year as a predictor variable, also was examined in this study. Given that the higher education institutional resources environment was changing during this period, there might have been some related variation over time in the criterion variables of interest.

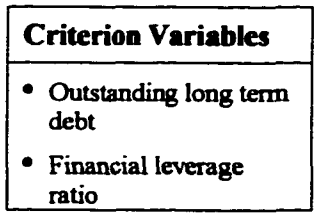

Figure 4. Criterion variables.

Criterion Variables

YEAR-END AMOUNT OF UNPAID LONG TERM DEBT

The Integrated Postsecondary Education Data System Finance Survey includes a data element, "indebtedness on physical plant - balance owed on principal at end of year." The amount reported by each institution in response to this annual Finance Survey item was used as the criterion variable for measuring each institution's year-end

level of outstanding unpaid long term debt. Because the focus of this study was long term debt at the institutional level, if the data file for a given year did not have an amount for an institution in this data field, all data for that institution for that year was excluded from the analysis. The study results section includes a summary of the total number of four-year institutions reporting any type of financial data each year versus the number reporting long term debt.

FINANCIAL LEVERAGE DUE TO LONG TERM DEBT

For each institution for each year the value of this variable was computed by dividing the first criterion variable, year-end level of long term debt, by the sum of long term debt plus a modified version of year-end fund balance. The leverage ratio is a measure of the degree of financial leverage due to debt in the financial structure (KPMG Peat Marwick, 1995; Wedig, 1994). Assets as measured and reported in dollars are supported either by surplus from operations, also called fund balance, or by debt. This is another way of stating the balance sheet concept.

$$\text{Assets} = \text{Liabilities} + \text{Fund Balance}$$

In college and university financial statements, three fund balances together represent core function current accumulated surplus from operations and external support: (a) current fund balance, (b) endowment fund balance, and (c) plant fund balance. These three are reported separately in the Integrated Postsecondary Education Data System Finance Survey. However, to keep all years' data compatible, plant fund balance could not be used because of a change in Integrated Postsecondary Education

Data System plant fund balance reporting requirements for the years 1988-89 to 1991-92 versus 1992-93 to 1995-96 (U.S. Department of Education, 1992, 1993). Therefore, for all institutions for all years, the reported values for "book value - buildings" plus "book value - equipment" were substituted for plant fund balance.

For each institution for each year the value of the financial leverage ratio variable was computed by dividing the first criterion variable, reported year-end level of long term debt, by the sum of long term debt plus current fund balance plus endowment fund balance plus book value of buildings plus book value of equipment. This new computed variable represented reported year-end degree of financial leverage due to long term debt. All variables of interest in this study and each variable's operationalized data source from the annual Integrated Postsecondary Education Data System Finance Survey files are presented in Table 2.

Data Description. Chapter 4, Results, includes summary descriptive statistics for the data collected. Reported institutional debt level and other variables related to debt, such as annual principal payments and interest expense, are summarized by year. Chapter 4 also presents other information important to the study, such as total amount of debt, reported long term debt among institutions of various sizes and missions, and annual fixed commitments for interest payments and repayment of principal in relation to total revenue.

The descriptive data analysis and presentation in Chapter 4 also includes the number of institutions reporting debt compared to the total number reporting financial information. For institutions reporting debt, descriptive data by institutional group

Table 2
Study Variables and Integrated Postsecondary Education Data System Finance Survey Data Source

	Variable	Finance Survey Response Item
Predictor Variables	**Value of buildings and equipment**	Current replacement value - buildings plus Current replacement value - equipment
	Annual revenue	Total current funds revenue
	Value of endowment assets	Market value of endowment assets
	Year	Fiscal reporting year
Criterion Variables	**Outstanding long term debt**	Indebtedness on physical plant - balance owed on principal at end of year
	Financial leverage ratio	
	Long term debt divided by Sum of long term debt and fund balance	Balance owed on principal at end of year
	Long term debt plus Fund balance	Balance owed on principal at end of year
	Current fund balance plus	Current fund balance
	Endowment fund balance plus	Funds functioning as endowment balance
	Book value of buildings plus	Book value - buildings
	Book value of equipment	Book value - equipment
Other Variables	Long term debt principal payments	Payments made on principal during year
	Long term debt interest payments	Interest payments on indebtedness

includes totals and means of reported year-end unpaid long term debt level, mean amount of debt principal and interest paid out during each year, and mean ratio of estimated replacement value of buildings and equipment to long term debt. Two descriptive financial ratios related to debt are also presented. One, debt service coverage, assesses business or operating risk. It is one measure of an organization's ability to meet debt service payments. It was computed by dividing annual current fund revenue by the sum of annual debt principal and interest payments (Johnson, 1994; KPMG Peat Marwick, 1995).

The second descriptive ratio is one of the criterion variables, a financial leverage ratio (see Figure 4). It was computed by dividing the year-end level of long term debt by the sum of long term debt plus year-end fund balance. For data analysis, all variables measured in dollars were adjusted for the effect of general price inflation for the period under consideration. This adjustment was made by transforming the data for each year after 1988-89 to the dollar equivalent of 1988-89 by applying price index deflation factors using the Higher Education Price Index (Research Associates of Washington, 1998).

In Chapter 4, for each reporting year under consideration, 1988-89 through 1995-96, a summary descriptive presentation and analysis of the variables listed above is provided for all four-year institutions in total, for four-year private versus four-year public institutions, and for each four-year Carnegie classification institutional category (Carnegie Foundation for the Advancement of Teaching, 1994). Group means and standard deviations are presented for each reporting category for each year as appropriate.

Institutional reporting categories for summarizing and presenting the data are from the four-year, non-proprietary institutional typology of the Carnegie Foundation for the Advancement of Teaching (Carnegie Foundation for the Advancement of Teaching, 1994): (a) Baccalaureate Colleges I and II, (b) Comprehensive Colleges and Universities I and II, (c) Doctoral Universities I and II, and (d) Research Universities I and II (see Appendix A). For data presentation within each of the Carnegie classification categories, the institutions are subdivided into private and public institutions.

Data Analysis. The purpose of this study was to explore the relationship between change in the level of institutional holdings of long term assets and change in general indicators of financial activity. Another purpose was to investigate change in the level of institutional long term debt and in institutional level financial leverage due to long term debt, all during the period from the late 1980s through the mid 1990s. The approach to achieving this was is to analyze how a set of predictor variables (replacement value of buildings and equipment, annual revenue, market value of endowment assets, and time) related to the level of outstanding long term debt and how they varied with financial leverage.

The relationships of interest involved two comparisons of combined changes in four predictor variables versus changes in one criterion variable. In order to analyze the strength of these relationships, correlation values for all two-variable combinations were computed, and multiple regression analysis was applied to the research data using the computer-based software, Statistical Package for the Social Sciences, version MS for Windows 6.1.3 (Norusis, 1993).

The bivariate correlation and multiple regression methods of data analysis provided information important for an analysis and interpretation of how debt level and financial leverage varied with the predictor variables. It provided analysis to support an examination of to what extent Wedig's (Wedig, 1994; Wedig et al., 1996) conceptual framework of debt's role in the nonprofit enterprise might be applied to an understanding of debt in the financial structure of colleges and universities.

The features of correlation and multiple regression analysis were used that relate primarily to theory development and testing rather than application and prediction (Licht, 1995). For this study this meant that interpretation of the overall multiple correlation coefficient and each predictor's partial regression coefficient was more relevant than using the multiple regression equation for predicting either level of outstanding debt or degree of financial leverage.

Multiple regression analysis provided information about the combined relationship of the predictor variables with the criterion and about the relative influence of each predictor as part of their joint relationship with the criterion. This aided in interpretation of whether the predictor variables selected for this study, as a group, were substantially correlated with the outcomes of interest or whether other predictors may need to be explored in future research on institutional long term debt. The multiple regression equations resulting from the analysis also indicated each predictor variable's relative weight or strength in defining their relationship as a group with each of the two criterion variables separately: the level of long term debt and the degree of financial leverage.

One aim of this study, for example, was to explore whether changes in revenue and endowment assets, not just changes in building and equipment value, were related to changes in amount of long term debt and financial leverage. The results of the multiple regression analysis provided tools to aid in this analysis by indicating each predictor variable's relative weight or strength in each multiple regression solution.

Through mathematical analysis, multiple regression derived the weighted combination of predictors that resulted in the highest correlation with an outcome

variable. In determining the weights for the combination with the highest correlation, the underlying analysis adjusted the weights so that the portion of variation in the outcome variable related to each of the predictors was eliminated from each of the other predictors. In other words, by determining the combination of weights (partial regression coefficients) assigned to the predictor variables in the multiple regression equation, the analysis adjusted each weight to leave only the variation in the criterion that was contributed by each predictor.

Using data from whatever particular group of institutions was entered into the analysis at any one time, the regression analysis specified a new variable, the weighted combination of all predictors, as applicable to that data. The results of the analysis indicated the strength of the correlation of the new variable with either level of outstanding debt or degree of financial leverage. This correlation, represented by the multiple regression $\underline{R}$, described the correlation between each possible level of the criterion and the level of the criterion predicted by the regression equation.

For evaluating the overall strength of correlation between the combined predictors and institutional debt level or degree of institutional financial leverage, the multiple regression analysis produced a multiple correlation coefficient, $\underline{R}$, and a coefficient of multiple determination, $\underline{R}^2$. The multiple correlation coefficient indicated the weighted combination of predictors represented in the regression equation in explaining the criterion specified, either degree of financial leverage or level of outstanding long term debt. The possible range was from $\underline{R} = 0$, meaning no correlation, to $\underline{R} = 1$, meaning complete or perfect correlation.

The coefficient of multiple determination, which is the square of R, or R^2, indicated how much variation was shared between the combination of predictor variables and either debt level or degree of financial leverage. For each multiple regression analysis performed for this study, an adjusted R^2 was computed to show the level of R^2 as adjusted for the number of variables and the number of institutions in the analysis.

For each analysis, an analysis of variance F-test was applied to test the hypothesis that R and R^2 were greater than 0 at a 95% confidence level (p less than .05). For this study, each multiple regression R^2 indicated how well the predictor variables, acting together, contributed to explaining variation in either debt levels or financial leverage in colleges and universities.

The weight, or partial regression coefficient, assigned as a result of multiple regression analysis to each predictor variable represented each predictor's role in explaining variation in either debt level or degree of financial leverage. The individual regression weights are not coefficients of correlation with the criterion variable because each has been adjusted through the regression analysis for any variation in the criterion that it shares with other predictors.

Each coefficient acts as a factor adjusting its predictor to leave it contributing only the variation in the criterion not explained by other predictors. Therefore, each partial regression coefficient indicated how much variation can be expected to occur in the criterion variable per one unit of change in the predictor related to that coefficient (Licht, 1995).

This was important for the present study because the partial regression coefficients provided information for interpreting the relative importance of the value of buildings and equipment, annual revenue, endowment asset value, and year of reported data, when acting together, in explaining levels of reported institutional outstanding debt or degree of institutional financial leverage. At the same time, each partial regression coefficient was either positive or negative, indicating whether the criterion tended to change in the same direction as the predictor or in the opposite direction.

The partial regression coefficients were generated by the regression analysis and reported in Chapter 4 in unstandardized and in standardized form. The standardized form of the coefficient, which means it was converted to standard deviation or z score units, is used when predictor and criterion variables are measured in different units. For example, for this study it was necessary to examine the coefficients in standardized form when degree of financial leverage was regressed on the predictor variables because financial leverage was in terms of a mathematical ratio, whereas the predictors were in terms of dollars and number of years. Even if the predictors and the criterion had all been in terms of dollars, the standardized coefficients would provide somewhat more practical information because they showed how many standard deviations the criterion would be expected to change with a change of one standard deviation in a predictor.

Although the overall multiple correlation coefficient, R, can be statistically significant without any of the individual partial regression coefficients contributing significantly to explaining variation in the criterion (Licht, 1995), if R was significant,

the results of the analysis were examined for the statistical significance of the calculated partial regression coefficients at the $p = .05$ level of significance. These significance tests were repeated t tests for each predictor's coefficient to determine whether the coefficient had at least a 95% chance of not equaling 0.

These multiple hypothesis tests within the same analysis were justified, without risking an increase in the chance of Type I error, as long as the overall multiple correlation coefficient, R, was significant (Licht, 1995). At the same time, the design of this research itself contributed to holding the chance of Type I error to a minimum while still providing meaningful results. The number of predictor variables is small, and the predictor and criterion variables were selected on the basis of a relevant theory and conceptual framework (Licht).

The simultaneous method of entering data on all predictors for each regression analysis was used because one of the purposes of this study was to explore the extent to which the results might be interpreted using propositions from Wedig's (Wedig, 1994; Wedig et al., 1996) model of nonprofit financial analysis. The simultaneous method of entering the predictor variables is appropriate for exploratory analysis and theory testing (Licht, 1995; Pedhazur, 1997).

Alternative approaches to sequencing entry of predictor variables in multiple regression analysis are hierarchical regression and forward or backward stepwise regression. If using hierarchical regression, the order in which the predictor variables enter the analysis would be determined before running the analysis. With forward or backward stepwise regression, the predictors would be added or deleted automatically by the Statistical Package for the Social Sciences computer program based on the order

in which each predictor had the most effect on either increasing or reducing the value of $\underline{R}$ and $\underline{R}^2$ (Licht, 1995).

The purpose of the present study was to examine the relative influence of the four predictor variables in explaining levels of long term debt and degree of financial leverage. Simultaneous entry and analysis of the variables was selected because there was no strong theoretical basis for justifying any particular order or sequence of strength of association of the predictors with either of the criterion variables (Licht, 1995).

Two separate multiple regression analyses were carried out on all data for all years. For each analysis, data were included for an institution if the institution reported outstanding long term debt as of the end of the year. For each analysis, the predictor variables were the institution's reported estimate of year-end replacement value of buildings and equipment, annual current fund revenue, year-end market value of endowment assets, and reporting year. For one analysis of all institutions for all years the criterion variable was reported year-end level of outstanding debt. For the other analysis of all institutions the criterion was the long term debt financial leverage ratio used in this study, calculated by dividing each institution's reported year-end long term debt level by the sum of long term debt plus reported year-end fund balance.

As with the descriptive data analysis and presentation, the results of all regression analyses are presented in Chapter 4: (a) for all institutions as a group, (b) for all private institutions, (c) for all public institutions, and (d) for each Carnegie classification category by private institutions versus public institutions. Analysis by these groupings rather than just for all institutions as a whole added meaning to the results of this study

and to their interpretation. Analysis by institutional classification category yielded some basis for assessing whether different types of institutions in terms of mission and size displayed different characteristics of debt management and had more or less long term debt in their financial structures by the mid 1990s versus the late 1980s. Performing the analyses by Carnegie classification category and by private institutions versus public institutions also provided some statistical control for any systematic variation in the criterion variables due to institutional category affiliation or due to private versus public control.

The value of the results of the multiple regression analyses and the ability to draw conclusions from them rest on a number of conditions and assumptions about the underlying data (Licht, 1995; Pedhazur, 1997; Tabachnick & Fidell, 1996). In Chapter 4, the results of the Statistical Package for the Social Sciences computer program's tests and measures of regression model assumptions are reported for each regression analysis performed for this study. For example, a high degree of intercorrelation among predictor variables will create potential problems for the mathematical analysis underlying multiple regression and for interpreting the individual contributions of predictor variables in explaining variation in the criterion. The condition index and two intercorrelation (collinearity) test statistics, tolerance and the variance inflation factor, are presented to assess the degree of collinearity.

In addition to collinearity, the distribution of residual or error differences derived from the regression equation may have a bearing on interpretation. Error or residual differences are the differences between the level of the criterion predicted by the regression equation and the actual observed value of the criterion for all levels of the

predictor variables. Ideally, residual differences should be normally distributed, uncorrelated with each other and with the predictors, have equal variances at all values of the predictors, have a mean of zero, and not be strongly influenced by outliers (Licht, 1995; Pedhazur, 1997; Tabachnick & Fidell, 1996).

In Chapter 4, the results of various tests of these assumptions are presented for each regression analysis. The results of the Durbin-Watson Test for independence of residual differences and a review of a P-P normal probability plot of the distribution of residual values are presented. The outcome of a casewise plot of standardized residual values is shown to indicate how many residual differences are more than three standard deviations from the mean of the distribution. The influence that outliers might have on the distribution of residual differences is examined by reporting on the computer program's output information on centered leverage value.

Chapter 4 - Results

Overall Findings

Long term debt reported by all four-year colleges and universities in the United States during the period under study grew in total from $23,648.5 million in 1989 to $35,449.5 million in 1996, an increase of $11,801.0 million or 49.9% (see Table 3). Each year's level increased compared to the previous year except for 1995-96 versus 1994-95. For all private four-year institutions, the total increased from $12,556.5

Table 3
Total Long Term Debt at Fiscal Year-End for All Four-Year Colleges and Universities in the Fifty States

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
TOTAL	$23,648.5	$25,399.1	$28,446.6	$30,973.5	$33,534.7	$35,758.5	$36,642.4	$35,449.5
N	1,090	1,107	1,118	1,136	1,139	1,162	1,158	1,100
PRIVATE	$12,556.5	$13,999.4	$15,290.8	$17,206.5	$18,701.1	$20,235.7	$20,802.7	$19,560.5
n	731	733	747	758	762	784	782	725
PUBLIC	$11,092.0	$11,399.7	$13,155.8	$13,767.0	$14,833.6	$15,522.8	$15,839.7	$15,889.0
n	359	374	371	378	377	378	376	375

Note. Dollar amounts are in millions.

million in 1988-89 to $19,560.5 million in 1995-96, an increase of $7,004.0 million or 55.8%, whereas long term debt in public four-year institutions went up by 43.2% or $4,797.0 million, from $11,092.0 million to $15,889.0.

In 1988-89, a total of 1,090 institutions reported holding long term debt. Of these, 731 were private and 359 were public. By 1995-96, 725 private institutions and

375 public institutions held debt, or a total of 1,100. At the beginning of the years under study, private institutions held 53.1% of the reported debt, whereas public institutions held 46.9%. In the last year, private institutions reported having 55.2% of the total with public institutions holding 44.8%.

The first research question focused on the level of long term debt during this period among four-year institutions of varying sizes and missions. The totals from Table 3 for private and for public institutions are subdivided by Carnegie institutional classification in Table 4.

Although reported debt increased in all groups over the period, the percentage increase was highest for public baccalaureate colleges, with the total increasing by 127.0%, from $151.3 million among 47 institutions in 1988-89 to $343.5 million among 56 institutions in 1995-96 (see Table 4). At 26.0%, the percentage increase was lowest for public research universities, which reported $7,398.3 million for 67 institutions in the first year and $9,320.1 million for 65 institutions in the last year. Private and public research universities held the largest share of debt both at the beginning and at end of the period, but their percentage shares of the total declined. In 1988-89, private research universities held 51.7% of the long term debt held by private institutions, but by 1995-96 they held only 47.7%. The public research university share of debt reported by all public institutions declined from 66.7% in 1988-89 to 58.7% in 1995-96.

The percentage share of long term debt increased for all other groups over the period, with the exception of the private doctoral universities. This group held 13.5%

of the private institutional long term debt in 1988-89 but only 12.1% in 1995-96. In general, there was a tendency for the number of both private and public institutions

Table 4
Total Long Term Debt by Carnegie Institutional Classification

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
PRIVATE								
Total	$12,556.5	$13,999.4	$15,290.8	$17,206.5	$18,701.1	$20,235.7	$20,802.7	$19,560.5
n	731	733	747	758	762	784	782	725
Baccalaureate	$2,315.2	$2,533.4	$2,809.0	$2,982.9	$3,342.6	$3,776.5	$4,000.8	$4,215.5
n	442	438	449	455	456	472	470	443
Comprehensive	$2,047.0	$2,357.1	$2,618.8	$2,901.0	$3,214.4	$3,533.4	$3,681.1	$3,644.2
n	212	216	220	223	226	229	230	213
Doctoral	$1,698.3	$2,000.5	$1,959.4	$2,290.1	$2,392.7	$2,692.5	$2,529.7	$2,373.0
n	42	44	43	43	41	45	43	37
Research	$6,496.0	$7,108.4	$7,903.6	$9,032.5	$9,751.4	$10,233.3	$10,591.1	$9,327.8
n	35	35	35	37	39	38	39	32
PUBLIC								
Total	$11,092.0	$11,399.7	$13,155.8	$13,767.0	$14,833.6	$15,522.8	$15,839.7	$15,889.0
n	359	374	371	378	377	378	376	375
Baccalaureate	$151.3	$192.2	$210.2	$237.0	$295.4	$312.0	$341.9	$343.5
n	47	54	55	55	53	54	56	56
Comprehensive	$2,026.5	$2,409.9	$2,591.7	$2,892.6	$3,179.7	$3,536.8	$3,626.2	$3,939.7
n	190	197	192	199	201	202	198	199
Doctoral	$1,515.9	$1,645.5	$1,771.5	$1,776.7	$1,981.4	$2,169.6	$2,135.9	$2,285.7
n	55	55	56	56	55	55	55	55
Research	$7,398.3	$7,152.1	$8,582.4	$8,860.7	$9,377.1	$9,504.4	$9,735.7	$9,320.1
n	67	68	68	68	68	67	67	65

Note. Dollar amounts are in millions.

holding long term debt to increase from 1988-89 through 1993-94, with a small decline for the last two years (see Table 4). All groups, however, had the same number of institutions or more reporting long term debt in the last year over the first year except

Table 5
Number of Institutions Reporting Financial Information and Number Reporting Long Term Debt

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
PRIVATE INSTITUTIONS								
Total								
Number reporting	861	865	862	864	862	861	861	866
Number with debt	731	733	747	758	762	784	782	725
Percent with debt	84.9%	84.7%	86.7%	87.7%	88.4%	91.1%	90.8%	83.7%
Baccalaureate								
Number reporting	529	530	531	532	530	530	530	533
Number with debt	442	438	449	455	456	472	470	443
Percent with debt	83.6%	82.6%	84.6%	85.5%	86.0%	89.1%	88.7%	83.1%
Comprehensive								
Number reporting	247	250	246	247	247	246	246	248
Number with debt	212	216	220	223	226	229	230	213
Percent with debt	85.8%	86.4%	89.4%	90.3%	91.5%	93.1%	93.5%	85.9%
Doctoral								
Number reporting	45	45	45	45	45	45	45	45
Number with debt	42	44	43	43	41	45	43	37
Percent with debt	93.3%	97.8%	95.6%	95.6%	91.1%	100.0%	95.6%	82.2%
Research								
Number reporting	40	40	40	40	40	40	40	40
Number with debt	35	35	35	37	39	38	39	32
Percent with debt	87.5%	87.5%	87.5%	92.5%	97.5%	95.0%	97.5%	80.0%
PUBLIC INSTITUTIONS								
Total								
Number reporting	504	504	505	504	500	501	500	498
Number with debt	359	374	371	378	377	378	376	375
Percent with debt	71.2%	74.2%	73.5%	75.0%	75.4%	75.4%	75.2%	75.3%
Baccalaureate								
Number reporting	84	84	84	84	82	82	81	81
Number with debt	47	54	55	55	53	54	56	56
Percent with debt	56.0%	64.3%	65.5%	65.5%	64.6%	65.9%	69.1%	69.1%
Comprehensive								
Number reporting	271	270	271	271	270	271	271	270
Number with debt	190	197	192	199	201	202	198	199
Percent with debt	70.1%	73.0%	70.8%	73.4%	74.4%	74.5%	73.1%	73.7%
Doctoral								
Number reporting	64	65	65	65	64	64	64	64
Number with debt	55	55	56	56	55	55	55	55
Percent with debt	85.9%	84.6%	86.2%	86.2%	85.9%	85.9%	85.9%	85.9%
Research								
Number reporting	85	85	85	84	84	84	84	83
Number with debt	67	68	68	68	68	67	67	65
Percent with debt	78.8%	80.0%	80.0%	81.0%	81.0%	79.8%	79.8%	78.3%

the private doctoral, private research, and public research categories. In reference to the first research question, therefore, the conclusion is that the amount of long term debt held by institutions of varying sizes and missions in both the private and public sectors increased over the period under study. By Carnegie classification, total debt held by the baccalaureate and comprehensive institutions experienced the greatest percentage growth. Between the first and last years under study, all groups increased in percentage share of the total amount of reported long term debt with the exception of research universities and private doctoral institutions.

The proportion of all reporting institutions issuing long term debt by Carnegie classification is similar for private and for public institutions. At the same time, by the end of the period compared to the beginning, a higher proportion of all public institutions were issuing long term debt, whereas for private institutions as a whole it was a slightly lower percentage (see Table 5).

In general, as shown in Table 5, a somewhat higher proportion of private institutions than public institutions reported holding long term debt. This is probably the case because, for public institutions, other governmental levels or borrowing authorities often hold and report on the long term debt from which public institutions benefit (King et al., 1994). Nevertheless, the public institution percentage increased steadily over the period and by the last year was not substantially below the percentage of private institutions reporting long term debt.

The greatest amount of long term debt reported by one institution as of the end of each year was always among the research universities, and in almost all groups the highest amount each year was greater than the year before (see Table 6). In 1988-89,

the highest amount held by any one institution was $810.9 million by a public research university. The first year-end amount exceeding $1 billion was $1.020 billion at a public research institution in 1991-92. By the end of 1995-96, the largest single amount was $1.249 billion, as reported by a private research university. Although the public baccalaureate colleges showed the greatest percentage increase in total debt over

Table 6
Range of Long Term Debt

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
PRIVATE INSTITUTIONS								
All								
High	$761.9 mil.	$749.1 mil.	$857.0 mil.	$959.6 mil.	$953.7 mil.	$1.158 bil.	$1.163 bil.	$1.249 bil.
Low	$1,711	$2,000	$2,441	$10,563	$1,574	$1,374	$7,524	$1,407
Baccalaureate								
High	$56.6 mil.	$56.6 mil.	$61.7 mil.	$61.6 mil.	$68.8 mil.	$71.2 mil.	$70.1 mil.	$130.7 mil.
Low	$1,711	$2,000	$24,219	$10,563	$1,574	$1,374	$17,477	$1,407
Comprehensive								
High	$94.4 mil.	$93.4 mil.	$98.4 mil.	$96.5 mil.	$94.0 mil.	$121.3 mil.	$127.0 mil.	$125.0 mil.
Low	$4,897	$19,527	$2,441	$28,411	$24,952	$20,535	$7,524	$89,232
Doctoral								
High	$212.5 mil.	$208.5 mil.	$213.3 mil.	$227.8 mil.	$247.1 mil.	$281.9 mil.	$299.0 mil.	$296.4 mil.
Low	$2.4 mil.	$44,804	$37,801	$2.0 mil.	$1.2 mil.	$222,686	$702,000	$1.8 mil.
Research								
High	$761.9 mil.	$749.1 mil.	$857.0 mil.	$959.6 mil.	$953.7 mil.	$1.158 bil.	$1.163 bil.	$1.249 bil.
Low	$4.4 mil.	$14.8 mil.	$14.6 mil.	$14.2 mil.	$18.9 mil.	$17.8 mil.	$23.2 mil.	$28.0 mil.
PUBLIC INSTITUTIONS								
All								
High	$810.9 mil.	$418.8 mil.	$936.7 mil.	$1.020 bil.	$1.000 bil.	$1.031 bil.	$1.117 bil.	$1.131 bil.
Low	$56,691	$5,383	$43,000	$22,000	$10,373	$10,000	$34,000	$26,000
Baccalaureate								
High	$31.2 mil.	$30.2 mil.	$29.2 mil.	$29.6 mil.	$35.0 mil.	$33.5 mil.	$32.6 mil.	$30.2 mil.
Low	$83,000	$5,383	$43,000	$22,000	$96,000	$66,000	$34,000	$26,000
Comprehensive								
High	$54.8 mil.	$80.0 mil.	$74.0 mil.	$83.5 mil.	$79.6 mil.	$86.0 mil.	$100.0 mil.	$174.0 mil.
Low	$56,691	$63,964	$70,000	$50,000	$10,373	$10,000	$57,302	$36,380
Doctoral								
High	$138.5 mil.	$173.0 mil.	$226.0 mil.	$216.4 mil.	$206.5 mil.	$206.6 mil.	$196.8 mil.	$228.9 mil.
Low	$1.4 mil.	$0.8 mil.	$1.7 mil.	$1.5 mil.	$1.2 mil.	$0.9 mil	$0.6 mil.	$0.4 mil.
Research								
High	$810.9 mil.	$418.8 mil.	$936.7 mil.	$1.020 bil.	$1.000 bil.	$1.031 bil.	$1.117 bil.	$1.131 bil.
Low	$78,515	$0.4 mil.	$0.4 mil.	$0.3 mil.	$0.3 mil.	$0.2 mil.	$0.2 mil	$92,021

this period, from $151.3 million to $343.5 million, or 127.0% (Table 4), the number of these institutions reporting long term debt remained quite stable (Table 5). The largest amount held by one institution in this category varied only slightly from year to year (Table 6).

Inflation-Adjusted Long Term Debt Levels

One factor affecting the meaning and interpretation of reported organizational financial information over time is change in the price paid for goods and services, or the purchasing power of the same number of dollars from one year to another. The price of college and university purchases is one variable affecting the level of reported financial data. One way of measuring changes in purchasing power is the construction of a price index, which indicates relative change in buying power of the same number of dollars in relation to a reference year.

One general price index applicable to goods and services purchased by colleges and universities in the United States is the Higher Education Price Index (Research Associates of Washington, 1998), which compares prices paid for a variety of typical higher education purchases from one year to the next (see Table 1). Table 7 presents Table 4's data on total amount of reported annual debt but shows the data as adjusted, using the Higher Education Price Index. The data for 1988-89 is the same in both tables because 1988-89 is the reference year for applying the price index adjustment. Using the price index adjustment factors, the data in each year after 1988-89 has been adjusted for general price change. In line with the second research question, the purpose of this adjustment was to factor out the influence of price change on the

criterion variable, amount of outstanding debt, so an assessment could be made of whether reported institutional long term debt changed during the period only because of general price change or whether debt increased or decreased in terms of constant 1988-89 purchasing power.

Table 7 shows that price-adjusted debt levels increased for private institutions as a whole and for all public institutions during the period under study. For each

Table 7
Total Long Term Debt Adjusted Using the Higher Education Price Index

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
PRIVATE INSTITUTIONS								
Total	$12,556.5	$13,206.9	$13,701.5	$14,884.5	$15,715.2	$16,451.8	$16,418.9	$14,988.9
n	731	733	747	758	762	784	782	725
Baccalaureate	$2,315.2	$2,390.0	$2,517.1	$2,580.4	$2,808.9	$3,070.4	$3,157.7	$3,230.3
n	442	438	449	455	456	472	470	443
Comprehensive	$2,047.0	$2,223.7	$2,346.6	$2,509.5	$2,701.2	$2,872.7	$2,905.4	$2,792.5
n	212	216	220	223	226	229	230	213
Doctoral	$1,698.3	$1,887.2	$1,755.7	$1,981.1	$2,010.7	$2,189.0	$1,996.6	$1,818.4
n	42	44	43	43	41	45	43	37
Research	$6,496.0	$6,706.0	$7,082.1	$7,813.6	$8,194.4	$8,319.7	$8,359.2	$7,147.7
n	35	35	35	37	39	38	39	32
PUBLIC INSTITUTIONS								
Total	$11,092.0	$10,754.4	$11,788.3	$11,909.2	$12,465.2	$12,620.1	$12,501.7	$12,175.5
n	359	374	371	378	377	378	376	375
Baccalaureate	$151.3	$181.3	$188.3	$205.0	$248.2	$253.6	$269.9	$263.2
n	47	54	55	55	53	54	56	56
Comprehensive	$2,026.5	$2,273.5	$2,322.3	$2,502.3	$2,672.1	$2,875.4	$2,862.0	$3,018.9
n	190	197	192	199	201	202	198	199
Doctoral	$1,515.9	$1,552.3	$1,587.3	$1,537.0	$1,665.0	$1,763.9	$1,685.8	$1,751.5
n	55	55	56	56	55	55	55	55
Research	$7,398.3	$6,747.3	$7,690.4	$7,665.0	$7,879.9	$7,727.2	$7,684.0	$7,141.9
n	67	68	68	68	68	67	67	65

Note. Dollar amounts are in millions.

Carnegie classification institutional group, total adjusted long term debt was higher in the last year than in the first, except for public research institutions. After adjusting for price level change over the period, total long term debt for all private institutions increased from $12,556.5 million to $14,988.9 million, or 19.4%. Adjusted amounts for all public institutions increased by 9.8%, from $11,092.0 million to $12,175.5 million. These increases in adjusted totals occurred despite the fact that the total number of private institutions reporting debt declined by 0.8%, from 731 to 725. The number of public institutions holding long term debt only increased by 4.5%, from 359 to 375. The contrast between the increase in total reported debt, even in inflation-adjusted terms, and the relatively constant number of institutions reporting debt demonstrates the increasing importance of debt in college and university finance during this period.

Table 8 presents the mean amount of long term debt for all private institutions in total and for private institutions by Carnegie classification sub-category. Table 9 presents this information for public institutions. These results confirm that the mean amount of debt held by institutions increased during the period under study. Among private colleges and universities, institutions in each Carnegie classification sub-category increased in mean level of debt held (see Table 8). The greatest percentage growth among private institution sub-categories in mean amount of long term debt over the period was in Comprehensive II institutions, which increased mean long term debt by 55.2%, from $4,008.6 thousand in the first year to $6,220.7 thousand in 1995-96. The smallest percentage growth in mean debt among private institution sub-categories

Table 8
Mean Long Term Debt for Private Colleges and Universities Adjusted Using the Higher Education Price Index

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
All Private								
M	$17,177.2	$18,017.7	$18,342.0	$19,636.5	$20,623.6	$20,984.4	$20,996.0	$20,674.3
SD	$52,872.7	$52,387.1	$55,759.9	$59,509.2	$60,140.4	$63,370.7	$61,849.9	$64,203.1
n	731	733	747	758	762	784	782	725
Baccalaureate I								
M	$10,436.3	$10,697.7	$11,314.4	$11,420.5	$12,429.3	$12,991.3	$13,232.3	$14,094.8
SD	$11,659.3	$11,596.3	$11,208.6	$10791.1	$12,535.2	$12,971.3	$12,238.7	$14,394.2
n	143	140	142	146	147	151	148	144
Baccalaureate II								
M	$2,752.1	$2,994.3	$2,965.6	$2,954.6	$3,177.4	$3,453.8	$3,724.7	$4,015.4
SD	$3,231.5	$3,532.6	$3,568.7	$4,073.1	$4,261.3	$4,474.3	$4,893.7	$5,263.7
n	299	298	307	309	309	321	322	299
Comprehensive I								
M	$11,782.3	$12,619.2	$13,331.4	$13,868.6	$14,537.0	$15,339.0	$15,252.0	$15,749.7
SD	$14,721.4	$16,064.9	$15,906.4	$15,984.0	$15,975.5	$17,340.0	$17,041.1	$16,305.8
n	154	156	157	161	164	165	167	154
Comprehensive II								
M	$4,008.6	$4,252.1	$4,024.7	$4,461.8	$5,115.1	$5,339.3	$5,687.7	$6,220.7
SD	$3,345.8	$3,859.1	$4,132.6	$4,203.7	$4,710.5	$6,370.8	$6,575.0	$6,886.5
n	58	60	63	62	62	64	63	59
Doctoral I								
M	$45,422.9	$46,381.7	$41,831.6	$47,277.7	$51,092.4	$51,002.1	$53,160.0	$55,291.2
SD	$58,980.4	$53,847.2	$51,198.7	$53,611.0	$56,790.7	$57,808.0	$57,581.9	$60,356.7
n	21	22	22	21	21	23	22	19
Doctoral II								
M	$35,450.6	$39,401.5	$39,782.0	$44,919.4	$46,885.9	$46,179.7	$39,384.4	$42,661.3
SD	$29,740.7	$38,096.8	$37,268.7	$41,994.9	$47,755.4	$46,241.4	$35,719.4	$37,500.3
n	21	22	21	22	20	22	21	18
Research I								
M	$221,694.2	$229,775.4	$244,075.2	$249,773.5	$252,896.5	$267,326.9	$260,799.3	$277,466.9
SD	$156,683.3	$140,607.5	$161,667.8	$171,666.0	$164,032.2	$190,464.4	$180,375.8	$219,749.5
n	26	26	26	28	29	28	29	23
Research II								
M	$81,325.1	$81,316.1	$81,792.7	$91,102.4	$86,041.2	$83,458.5	$79,599.5	$85,107.5
SD	$53,185.2	$44,508.9	$39,852.1	$48,503.5	$49,919.7	$47,565.4	$31,604.9	$34,374.3
n	9	9	9	9	10	10	10	9

Note. Dollar amounts are in thousands.

was in the Research II group, where the change in the mean amount held was from $81,325.1 thousand to $85,107.5 thousand, or 4.7%.

Among public institutions, the mean amount of institutional debt in inflation-adjusted terms increased between the first year and the last in all Carnegie sub-

categories except Baccalaureate I and Research II (see Table 9). The greatest amount of percentage decline in mean, price-adjusted debt was among public Baccalaureate I

Table 9
Mean Long Term Debt for Public Colleges and Universities Adjusted Using the Higher Education Price Index

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
All Public								
M	$30,896.9	$28,755.1	$31,774.5	$31,505.8	$33,064.3	$33,386.6	$33,249.3	$32,468.0
SD	$69,535.5	$55,966.1	$72,157.1	$72,700.5	$72,776.4	$72,136.2	$73,808.9	$69,161.4
n	359	374	371	378	377	378	376	375
Baccalaureate I								
M	$7,957.3	$7,221.7	$6,614.0	$6,421.2	$8,928.5	$8,301.4	$7,765.9	$7,065.2
SD	$10,460.7	$9,586.3	$8,796.0	$8,631.2	$9,868.4	$9,190.0	$8,726.4	$7,902.5
N	6	6	6	6	6	6	6	6
Baccalaureate II								
M	$2,525.7	$2,875.3	$3,033.6	$3,396.7	$4,141.8	$4,246.2	$4,465.7	$4,416.3
SD	$1,862.5	$3,576.9	$3,687.8	$3,877.0	$4,513.9	$4,550.5	$4,858.4	$4,748.1
n	41	48	49	49	47	48	50	50
Comprehensive I								
M	$10,965.1	$11,899.0	$12,605.0	$12,956.7	$13,567.6	$14,662.4	$14,877.8	$15,631.2
SD	$11,479.5	$13,719.5	$13,995.1	$14,615.5	$14,350.7	$15,113.5	$15,537.6	$17,157.7
n	173	181	176	183	185	185	181	182
Comprehensive II								
M	$7,618.1	$7,486.3	$6,488.4	$8,199.7	$10,127.9	$9,581.3	$9,948.8	$10,236.5
SD	$6,919.2	$5,922.2	$4,922.4	$6,350.9	$7,512.5	$8,369.6	$8,927.8	$9,670.5
n	17	16	16	16	16	17	17	17
Doctoral I								
M	$34,418.9	$34,733.8	$33,921.6	$32,870.5	$36,988.1	$38,249.5	$35,487.5	$35,190.1
SD	$32,551.5	$30,695.2	$29,188.8	$26,914.2	$34,783.3	$33,652.1	$31,638.1	$28,793.5
n	23	23	23	23	22	22	22	22
Doctoral II								
M	$22,634.0	$23,544.9	$24,459.1	$23,664.8	$25,796.6	$27,953.0	$27,426.7	$29,616.8
SD	$26,989.1	$31,277.2	$35,844.7	$33,268.2	$31,594.6	$29,658.7	$28,559.5	$31,668.7
n	32	32	33	33	33	33	33	33
Research I								
M	$138,997.5	$126,919.2	$148,575.3	$150,760.7	$155,767.1	$155,275.4	$154,706.0	$145,969.0
SD	$144,180.7	$106,711.5	$152,442.0	$158,642.0	$154,917.7	$156,678.4	$163,362.9	$153,777.9
n	47	46	46	45	45	44	44	43
Research II								
M	$43,271.9	$41,316.8	$38,904.6	$38,294.0	$37,843.2	$38,914.7	$38,129.1	$39,327.4
SD	$29,863.8	$27,659.8	$26,097.7	$24,653.1	$25,529.6	$23,805.1	$22,832.3	$21,596.0
n	20	22	22	23	23	23	23	22

Note. Dollar amounts are in thousands.

institutions, where the mean level declined by 11.2%, from $7,957.3 thousand to $7,065.2 thousand. The largest percentage increase among public institutions was in

the Baccalaureate II sub-category, where the mean increased from $2,525.7 thousand in 1988-89 to $4,416.3 thousand in 1995-96, or 74.8%.

The analysis presented in Table 7, Table 8, and Table 9 addresses the second research question. On the whole these results show that the amount of outstanding long term debt at the institutional level increased during the period under study among both private and public institutions, even after adjusting for change in the purchasing power of institutional resources. At the same time, however, the information on range of long term debt held by institutions presented in Table 6 and the standard deviation of amounts by Carnegie sub-category by year, as shown in Table 8 and Table 9, indicate substantial variation in the amount held by different institutions each year.

The overall mean amount held by private institutions and by public institutions was greater in inflation-adjusted terms in the last year than in the first year. For private institutions in total the mean amount of long term debt increased steadily through 1994-95 and declined for the first time in 1995-96 (see Table 8), whereas the mean for public institutions as a whole dropped compared to the previous year in 1989-90, in 1991-92, and in 1994-95 (see Table 9).

Consequences: Interest and Principal Repayment Obligations

Issuing and carrying long term debt obligates and channels resources to repayment of debt principal and to payment of interest expense. Debt-supported projects often result in increased revenue to a college or university, but regardless of whether or not debt results in more revenue, current resources must be diverted from

other potential applications and committed to repayment of debt principal plus interest charges.

In the years under consideration in this study, the mean annual price index-adjusted principal and interest charge for all private institutions increased by 32.6%, from $2,256.2 thousand in 1988-89 to $2,991.2 thousand in 1995-96 (see Table 10).

Table 10
Mean Long Term Debt Principal and Interest Payments for Private Colleges and Universities Adjusted Using the Higher Education Price Index

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
All Private								
M	$2,256.2	$2,284.2	$2,221.3	$2,679.6	$2,708.1	$2,762.4	$2,660.0	$2,991.2
SD	$8,737.9	$6,441.4	$6,209.8	$8,144.9	$7,885.6	$8,826.1	$10,650.1	$12,121.8
n	731	733	747	758	762	784	782	725
Baccalaureate I								
M	$1,381.6	$1,539.3	$1,387.2	$1,665.1	$1,993.5	$1,655.8	$1,397.3	$1,592.2
SD	$2,309.5	$2,408.1	$2,042.8	$2,663.2	$3,324.0	$2,595.9	$1,713.1	$2,083.6
n	143	140	142	146	147	151	148	144
Baccalaureate II								
M	$515.5	$447.4	$524.2	$646.1	$513.7	$557.9	$535.8	$626.2
SD	$744.2	$538.4	$1,289.6	$2,183.9	$885.6	$871.6	$680.8	$1,198.7
n	299	298	307	309	309	321	322	299
Comprehensive I								
M	$1,700.2	$1,738.0	$2,328.2	$2,260.7	$2,369.8	$2,052.5	$1,801.0	$2,691.4
SD	$2,257.6	$2,263.7	$4,555.9	$3,881.8	$3,793.5	$2,857.8	$2,420.7	$6,841.8
n	154	156	157	161	164	165	167	154
Comprehensive II								
M	$795.4	$762.4	$731.0	$693.2	$893.7	$953.6	$765.0	$1,065.9
SD	$990.7	$825.0	$853.0	$826.9	$1,450.3	$1,927.9	$1,135.7	$1,465.7
n	58	60	63	62	62	64	63	59
Doctoral I								
M	$6,141.2	$5,073.7	$4,569.0	$9,282.2	$9,249.4	$12,085.5	$5,002.1	$5,784.7
SD	$10,681.7	$5,004.5	$5,178.1	$24,504.2	$15,140.3	$24,589.1	$4,897.9	$7,066.2
n	21	22	22	21	21	23	22	19
Doctoral II								
M	$3,781.5	$7,459.9	$4,279.5	$7,345.8	$7,411.9	$4,977.1	$5,180.3	$5,161.2
SD	$2,387.5	$15,617.1	$4,927.7	$10,737.5	$16,549.9	$5,704.7	$6,793.1	$7,001.6
n	21	22	21	22	20	22	21	18
Research I								
M	$26,872.0	$23,066.6	$23,346.5	$26,614.6	$25,316.0	$31,016.3	$34,007.0	$43,551.4
SD	$35,912.0	$15,603.0	$18,820.1	$19,313.1	$21,970.8	$24,278.4	$40,577.2	$49,207.5
n	26	26	26	28	29	28	29	23
Research II								
M	$9,176.6	$14,797.4	$10,270.3	$8,851.2	$9,114.4	$8,100.9	$14,677.0	$7,804.0
SD	$5,340.9	$13,987.0	$7,940.6	$5,152.6	$6,133.9	$5,649.8	$23,613.0	$4,098.1
n	9	9	9	9	10	10	10	9

Note. Dollar amounts are in thousands.

In each Carnegie institutional sub-category the mean obligation was greater in the last year than in the first, except for Doctoral I and Research II institutions.

When total current revenue for the institution is compared to principal repayment and interest obligations by year, reported mean revenue for all private institutions as a group rose faster than mean debt repayment obligation (Table 11). In the last year, the

Table 11
Mean Ratio of Current Revenue to Principal and Interest Payments for Private Colleges and Universities

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
All Private								
M	67.5	99.2	104.7	79.8	81.3	96.4	75.3	81.1
SD	143.6	719.7	797.2	368.6	351.7	442.6	383.0	439.9
n	731	733	747	758	762	784	782	725
Baccalaureate I								
M	82.6	201.8	72.7	75.6	53.9	86.3	49.2	49.1
SD	195.2	1,487.7	177.4	250.6	78.2	320.8	71.7	98.5
n	143	140	142	146	147	151	148	144
Baccalaureate II								
M	74.7	100.4	100.4	113.4	109.2	143.5	102.5	124.2
SD	146.8	476.3	528.0	544.5	524.8	645.4	580.6	673.2
n	299	298	307	309	309	321	322	299
Comprehensive I								
M	57.5	53.5	53.3	45.0	82.5	61.6	68.8	55.2
SD	117.0	97.5	95.0	53.2	198.9	126.2	167.3	129.1
n	154	156	157	161	164	165	167	154
Comprehensive II								
M	45.1	44.7	98.9	59.9	80.2	44.8	49.1	45.3
SD	63.4	59.2	404.5	93.7	144.4	32.0	43.9	46.2
n	58	60	63	62	62	64	63	59
Doctoral I								
M	33.4	31.7	34.6	37.0	31.1	25.4	34.7	32.1
SD	23.3	21.9	18.0	21.7	25.6	15.7	18.3	13.8
n	21	22	22	21	21	23	22	19
Doctoral II								
M	36.9	33.6	961.1	37.1	42.9	47.2	71.9	73.2
SD	30.6	29.8	4,121.1	36.0	44.7	54.3	120.6	114.2
n	21	22	21	22	20	22	21	18
Research I								
M	45.4	42.4	36.8	43.9	42.1	37.8	39.9	41.1
SD	59.3	59.0	23.2	48.5	44.7	35.3	36.4	43.3
n	26	26	26	28	29	28	29	23
Research II								
M	118.9	128.2	62.5	58.7	73.5	73.5	67.2	70.3
SD	247.7	271.5	84.4	70.3	79.8	76.2	77.5	83.1
n	9	9	9	9	10	10	10	9

mean ratio of total current revenue to debt principal and interest payment was 81.1, whereas it was only 67.5 in the first year. However, five of the eight private institutional sub-categories had lower mean ratios in 1995-96 than in 1988-89, including Baccalaureate I, Comprehensive I, Doctoral I, Research I, and Research II institutions.

Table 12
Mean Long Term Debt Principal and Interest Payments for Public Colleges and Universities Adjusted Using the Higher Education Price Index

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
All Public								
M	$4,776.6	$3,688.5	$5,824.0	$5,819.7	$8,218.5	$5,903.5	$4,249.3	$4,952.3
SD	$11,684.8	$7,897.4	$27,437.6	$19,126.4	$27,066.4	$12,581.9	$10,410.4	$17,963.5
n	359	374	371	378	377	378	376	375
Baccalaureate I								
M	$802.8	$719.9	$743.5	$653.6	$669.8	$807.6	$793.6	$1,103.0
SD	$1,072.1	$927.7	$981.6	$858.5	$868.1	$937.4	$861.3	$1,568.3
n	6	6	6	6	6	6	6	6
Baccalaureate II								
M	$334.9	$440.8	$469.0	$357.4	$798.0	$1,007.7	$417.4	$555.3
SD	$319.4	$492.3	$589.9	$396.5	$2,527.0	$1,846.6	$460.5	$817.5
n	41	48	49	49	47	48	50	50
Comprehensive I								
M	$1,975.6	$1,524.3	$1,909.0	$2,502.1	$2,711.7	$2,729.5	$1,926.9	$2,581.6
SD	$3,159.2	$1,807.3	$3,177.3	$5,368.0	$5,285.7	$4,482.3	$2,074.5	$4,124.9
n	173	181	176	183	185	185	181	182
Comprehensive II								
M	$2,263.8	$1,167.3	$1,686.4	$1,335.8	$2,027.4	$2,467.6	$1,080.3	$1,728.6
SD	$4,051.6	$1,072.1	$1,873.4	$1,227.8	$2,665.3	$4,486.8	$946.5	$2,113.8
n	17	16	16	16	16	17	17	17
Doctoral I								
M	$4,665.9	$4,548.1	$4,538.6	$6,209.7	$7,950.5	$5,029.3	$4,379.0	$4,004.6
SD	$3,714.0	$4,016.3	$2,995.4	$7,750.8	$10,697.9	$2,775.7	$2,998.6	$2,844.0
n	23	23	23	23	22	22	22	22
Doctoral II								
M	$3,170.4	$2,597.0	$4,032.2	$2,842.3	$3,615.8	$7,799.7	$3,893.4	$4,360.4
SD	$3,739.7	$2,955.5	$10,745.2	$3,320.8	$3,775.0	$12,791.9	$4,940.2	$7,313.4
n	32	32	33	33	33	33	33	33
Research I								
M	$21,016.9	$16,006.6	$30,329.6	$28,877.1	$44,318.3	$23,922.2	$19,385.8	$22,536.5
SD	$25,576.1	$16,782.9	$72,261.6	$47,599.7	$65,431.2	$26,087.2	$24,540.3	$48,234.6
n	47	46	46	45	45	44	44	43
Research II								
M	$5,971.3	$6,156.2	$6,259.0	$7,089.6	$10,182.7	$9,164.3	$5,530.0	$5,565.8
SD	$5,543.4	$4,343.6	$6,469.5	$6,764.1	$16,641.1	$8,200.2	$3,972.2	$3,095.1
n	20	22	22	23	23	23	23	22

Note. Dollar amounts are in thousands.

Although the mean annual principal and interest charge for all private institutions increased by 32.6% during this period, the annual mean for all public institutions only increased by 3.7%, from $4,776.6 thousand in 1988-89 to $4,952.3 thousand in 1995-96 (see Table 12). The mean public institution obligation, however, was about $2,520.0 thousand higher than the mean of all private institutions at the beginning of

Table 13
Mean Ratio of Current Revenue to Principal and Interest Payments for Public Colleges and Universities

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
All Public								
M	137.4	120.8	168.8	162.0	99.9	103.5	107.8	116.9
SD	491.8	360.0	1,107.8	977.2	434.4	484.0	526.6	561.8
n	359	374	371	378	377	378	376	375
Baccalaureate I								
M	65.3	72.6	75.3	74.4	84.4	73.1	75.0	81.1
SD	48.3	54.0	57.6	42.9	66.4	65.4	70.3	77.0
n	6	6	6	6	6	6	6	6
Baccalaureate II								
M	81.5	97.9	503.7	479.1	106.1	93.1	142.2	117.3
SD	76.4	127.9	2,884.4	2,505.1	152.9	143.9	221.5	171.1
n	41	48	49	49	47	48	50	50
Comprehensive I								
M	141.8	135.8	126.1	120.6	90.7	87.8	72.3	94.8
SD	308.1	314.3	201.6	239.3	130.9	133.0	100.7	152.3
n	173	181	176	183	185	185	181	182
Comprehensive II								
M	71.4	83.9	73.8	77.8	65.9	171.9	134.0	129.0
SD	106.8	120.9	110.2	124.9	105.9	421.6	243.4	242.1
n	17	16	16	16	16	17	17	17
Doctoral I								
M	45.9	48.6	44.1	43.4	42.4	38.5	58.0	65.4
SD	30.7	29.8	28.0	31.3	34.4	30.1	53.5	59.5
n	23	23	23	23	22	22	22	22
Doctoral II								
M	94.6	107.0	98.7	83.9	66.0	54.8	80.7	72.2
SD	103.2	116.8	100.0	89.9	69.2	60.5	81.8	72.7
n	32	32	33	33	33	33	33	33
Research I								
M	311.7	182.9	188.9	205.7	223.9	257.1	281.9	301.8
SD	1,198.7	788.1	847.6	950.9	1,202.5	1,341.7	1,478.0	1,597.3
n	47	46	46	45	45	44	44	43
Research II								
M	54.9	53.4	52.2	53.3	48.7	46.4	57.3	56.8
SD	32.2	33.3	30.2	30.1	25.9	36.8	33.2	33.9
n	20	22	22	23	23	23	23	22

this period and about $1,961.0 thousand higher at the end. In contrast to all private institutions, the public institutions as a whole realized a decline in the mean ratio of total current revenue to debt principal and interest payments, from 137.4 in 1988-89 to 116.9 in 1995-96 (see Table 13). However, only three of the eight public institutional sub-categories had lower mean ratios in the last year compared to the first, including Comprehensive I, Doctoral II, and Research I institutions.

The primary use of long term debt among colleges and universities is for construction and renovation of facilities and for purchase of other long-life assets, such as equipment. This study's third research question addresses the relationship between investment in long term fixed assets and the level of long term debt. For this study, this relationship was measured using the ratio of estimated replacement value of institutional buildings and equipment to the amount of outstanding long term debt. This means that the higher the ratio, the more the value of buildings and equipment exceeds the amount of outstanding long term debt. For private colleges and universities as a whole (see Table 14), the mean ratio in the first year was 71.1, it rose in the early years of this period, declined, increased again, and then fell and ended the last year at 54.8.

The mean buildings and equipment to debt ratio for all public institutions (see Table 15) also varied from year to year but not as widely as the private institutions. This ratio for all public institutions started the period at 51.6, it was fairly stable for several years in the early 1990s until it increased again by the mid-1990s, and then it ended 1995-96 at 81.4, which was higher than in 1988-89 and higher than that for all private institutions at the end of 1995-96.

Table 14
Mean Ratio of Estimated Replacement Value of Buildings and Equipment to Long Term Debt for Private Colleges and Universities

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
All Private								
M	71.1	82.2	35.2	32.1	73.0	64.8	38.6	54.8
SD	837.6	792.9	211.7	192.1	1,193.9	910.4	309.9	688.7
n	730	731	745	756	762	782	779	722
Baccalaureate I								
M	48.3	94.9	34.4	24.8	20.7	26.6	19.7	24.3
SD	167.2	586.3	98.0	88.4	55.8	92.0	88.0	125.3
n	143	140	142	146	147	151	148	144
Baccalaureate II								
M	101.7	98.7	30.4	49.6	149.8	118.2	50.2	108.8
SD	1,161.8	1,096.7	74.0	286.8	1,869.1	1,409.3	371.3	1,066.1
n	299	297	305	307	309	319	320	296
Comprehensive I								
M	84.6	76.7	30.3	15.0	21.2	38.8	40.7	11.1
SD	823.2	493.6	203.3	35.5	103.5	233.2	367.4	22.2
n	154	156	157	161	164	165	166	154
Comprehensive II								
M	16.3	17.7	27.4	39.2	35.7	25.3	15.3	20.9
SD	15.5	23.0	60.7	127.4	150.1	76.7	20.3	34.6
n	58	60	63	62	62	64	63	59
Doctoral I								
M	9.0	4.9	9.0	6.4	5.6	7.8	126.0	8.2
SD	13.0	4.7	17.8	9.2	5.4	10.7	548.0	11.2
n	21	22	22	21	21	23	22	19
Doctoral II								
M	8.1	191.9	245.0	7.8	11.4	13.7	16.4	22.3
SD	15.0	835.1	1,039.9	19.6	29.0	40.7	51.7	72.0
n	21	22	21	22	20	22	21	18
Research I								
M	5.2	5.4	5.2	5.0	4.7	7.1	4.7	4.4
SD	5.5	5.2	4.7	4.4	4.2	15.6	3.2	3.3
n	25	25	26	28	29	28	29	23
Research II								
M	17.6	9.2	9.9	10.6	10.0	11.4	8.1	7.4
SD	34.5	10.7	12.3	13.8	11.6	11.9	7.6	6.0
n	9	9	9	9	10	10	10	9

As shown in Table 14, the general tendency among Carnegie institutional sub-categories for private institutions was for the research institutions to have the lowest buildings and equipment to debt ratios, which means they had higher amounts of long term debt in relation to facilities and equipment value. Also, the annual mean ratios among the private Doctoral I institutions were similar to the private Research

Table 15
Mean Ratio of Estimated Replacement Value of Buildings and Equipment to Long Term Debt for Public Colleges and Universities

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
All Public								
M	51.6	35.7	33.5	37.8	40.4	57.6	52.8	81.4
SD	346.2	142.9	172.3	219.3	280.8	471.2	513.9	934.2
n	358	373	370	378	377	378	376	375
Baccalaureate I								
M	21.8	25.2	34.9	18.3	16.6	21.8	28.0	36.9
SD	16.4	17.5	32.2	16.9	22.9	30.1	40.8	56.3
n	6	6	6	6	6	6	6	6
Baccalaureate II								
M	33.0	43.0	27.4	33.2	40.7	47.2	72.8	117.0
SD	48.4	119.6	40.8	57.4	81.5	110.6	196.6	469.2
n	41	48	49	49	47	48	50	50
Comprehensive I								
M	39.0	40.1	32.3	32.6	34.2	54.8	23.8	26.1
SD	114.8	147.9	105.0	126.7	161.3	449.4	70.1	75.7
n	172	180	176	183	185	185	181	182
Comprehensive II								
M	23.3	19.3	14.0	12.4	12.1	12.3	14.9	16.3
SD	31.7	25.8	18.7	22.0	23.5	20.9	27.2	26.8
n	17	16	16	16	16	17	17	17
Doctoral I								
M	12.0	12.3	15.3	21.0	15.0	12.8	11.8	15.1
SD	9.1	9.7	10.6	28.2	11.9	10.3	8.9	12.3
n	23	23	23	23	22	22	22	22
Doctoral II								
M	18.0	19.1	18.7	39.3	18.7	34.7	15.9	14.2
SD	26.6	25.6	29.3	108.6	34.1	91.4	27.9	29.3
n	32	32	33	33	33	33	33	33
Research I								
M	185.4	50.7	79.3	95.7	121.6	165.4	235.5	425.5
SD	917.9	250.8	437.8	567.1	733.1	1,011.6	1,466.7	2,680.8
n	47	46	46	45	45	44	44	43
Research II								
M	16.3	15.7	15.8	12.9	12.9	14.0	14.5	14.3
SD	11.7	9.8	11.2	12.7	11.5	11.3	12.8	12.0
n	20	22	21	23	23	23	23	22

institutions, whereas the private Baccalaureate I institutions were similar in general to the private Comprehensive institutions. The private Baccalaureate II institutions usually had the highest mean ratios of any sub-category among the private institutions, which means they tended to have the least amount of debt in relation to building and equipment values of any group of private institutions.

Among public institutions there was a tendency for the annual mean ratios of buildings and equipment to long term debt (see Table 15) to be more similar among all Carnegie institutional sub-categories than was the case among private institutional sub-categories (Table 14). The exception among public institutional sub-categories was Research I institutions, which usually had a substantially higher annual mean ratio than other public institution sub-categories. This means that the value of facilities and equipment among the public Research I universities tended to be quite a bit higher in relation to the amount of long term debt reported by these same institutions than was normally the case with public institutions in other institutional sub-categories. This is in sharp contrast to the private Research I universities (Table 14), which generally had the highest levels of debt in relation to buildings and equipment among all private institutions.

Consequences: Effect on Financial Structure

The role of long term debt financing in the general financial structure of four-year colleges and universities in the United States was another area for analysis in the present study. Given the increasing financial constraints and competitive pressures higher education institutions faced during this period, the fourth research question focused on whether there was a trend toward more reliance on long term debt in relation to other accumulated sources of financing. Long term debt's relationship to all long term financing, or financial leverage, was measured by computing the ratio of reported long term debt to the sum of long term debt plus fund balance (with fund balance in this study including current fund balance, endowment fund balance, and

book value of buildings and equipment). Lower ratios mean that long term debt played a smaller role in total financing, whereas higher ratios mean that long term debt's role was greater.

Annual mean ratios for the private institutions as a whole and for each Carnegie private institutional sub-category are presented in Table 16. For all private colleges

Table 16
Mean Ratio of Long Term Debt to Long Term Debt and Fund Balance for Private Colleges and Universities

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
All Private								
M	.143	.136	.148	.157	.186	.184	.188	.184
SD	.253	.144	.127	.149	.127	.152	.136	.131
n	731	733	747	758	762	784	782	725
Baccalaureate I								
M	.097	.100	.106	.110	.166	.163	.167	.164
SD	.072	.070	.074	.071	.106	.096	.090	.087
n	143	140	142	146	147	151	148	144
Baccalaureate II								
M	.147	.127	.144	.143	.164	.173	.177	.175
SD	.379	.193	.148	.130	.128	.150	.146	.148
n	299	298	307	309	309	321	322	299
Comprehensive I								
M	.159	.160	.182	.192	.219	.204	.213	.209
SD	.094	.102	.121	.121	.136	.209	.156	.138
n	154	156	157	161	164	165	167	154
Comprehensive II								
M	.148	.145	.144	.173	.201	.192	.193	.184
SD	.087	.089	.109	.128	.126	.127	.133	.126
n	58	60	63	62	62	64	63	59
Doctoral I								
M	.197	.216	.208	.311	.260	.234	.242	.226
SD	.113	.134	.134	.525	.094	.086	.090	.093
n	21	22	22	21	21	23	22	19
Doctoral II								
M	.192	.201	.174	.197	.231	.223	.222	.227
SD	.123	.122	.109	.108	.131	.119	.122	.126
n	21	22	21	22	20	22	21	18
Research I								
M	.149	.150	.165	.156	.218	.219	.210	.198
SD	.070	.072	.086	.089	.101	.109	.101	.071
n	26	26	26	28	29	28	29	23
Research II								
M	.150	.148	.156	.167	.206	.187	.180	.200
SD	.070	.076	.077	.083	.143	.127	.114	.135
n	9	9	9	9	10	10	10	9

and universities as a group, the mean ratio of long term debt to debt and fund balance increased throughout the period, beginning at .143 in the first year and ending at .184 in 1995-96. For all public institutions as a group (see Table 17), the mean ratio was lower in each year than the total private mean ratio. However, like the private institutions as a whole, the overall trend for public colleges and universities was toward

Table 17
Mean Ratio of Long Term Debt to Long Term Debt and Fund Balance for Public Colleges and Universities

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
All Public								
M	.120	.119	.123	.125	.132	.139	.136	.136
SD	.094	.093	.096	.095	.101	.102	.103	.100
n	359	374	371	378	377	378	376	375
Baccalaureate I								
M	.123	.109	.103	.099	.126	.116	.104	.116
SD	.080	.076	.073	.072	.092	.086	.082	.080
n	6	6	6	6	6	6	6	6
Baccalaureate II								
M	.088	.088	.098	.108	.120	.124	.123	.120
SD	.050	.066	.092	.103	.120	.119	.109	.109
n	41	48	49	49	47	48	50	50
Comprehensive I								
M	.126	.126	.132	.131	.136	.147	.146	.146
SD	.113	.110	.106	.101	.106	.108	.111	.106
n	173	181	176	183	185	185	181	182
Comprehensive II								
M	.126	.124	.114	.143	.163	.143	.145	.143
SD	.085	.076	.076	.104	.127	.124	.123	.128
n	17	16	16	16	16	17	17	17
Doctoral I								
M	.134	.132	.126	.125	.132	.134	.122	.122
SD	.077	.070	.065	.063	.071	.067	.063	.060
n	23	23	23	23	22	22	22	22
Doctoral II								
M	.106	.110	.111	.121	.116	.140	.140	.146
SD	.075	.076	.073	.102	.072	.086	.092	.094
n	32	32	33	33	33	33	33	33
Research I								
M	.131	.130	.132	.131	.145	.145	.140	.137
SD	.081	.078	.083	.078	.089	.089	.088	.088
n	47	46	46	45	45	44	44	43
Research II								
M	.107	.101	.122	.096	.095	.097	.092	.093
SD	.050	.044	.125	.043	.044	.041	.037	.037
n	20	22	22	23	23	23	23	22

an increasing mean financial leverage ratio throughout the period. By the end of the period, the overall public mean ratio was .136, whereas it was .120 in 1988-89.

In each private Carnegie institutional sub-category (see Table 16), the mean ratio was higher in 1995-96 than in the first year, which suggests there was a tendency for private institutions at all levels to increase long term debt in relation to other long term funding sources. Among the eight public institution Carnegie sub-categories (see Table 17), five had higher mean ratios in the last year compared to the first, and three had lower ratios. For all sub-categories for both private and for public institutions, the mean ratios were inclined to increase from the beginning of the period under study through 1993-94 and then level off or decline slightly in the last two years. This indicates that even though long term debt played an increasingly important role in general financing, on the average its contribution continued to be one part of a balanced financial mix, depending on constantly changing demands for resources and relative availability and cost of one source of financing versus another.

Variation in Long Term Debt: One to One Relationships

The fifth research question asked what measurable and statistically significant relationships might have existed during this period between the predictor variables of annual revenue, endowment value, replacement value of buildings and equipment, and time period on the one hand, and the criterion variables of level of long term debt and ratio of long term debt to debt plus fund balance on the other hand. In responding to the first four research questions, the data are analyzed and compared on an annual basis. Each institution was counted as one case in each year it reported data. For the

analysis for the fifth question, all years are combined for simultaneous analysis. This means, for example, that if an institution reported all data in all eight years, it was treated as eight different cases on all variables, including year, which is one of the predictor variables.

As in each annual analysis beginning with Table 7, all of the following tables present the results of analysis based on data adjusted for general change in college and university purchasing power over the years under study using the Higher Education Price Index (Research Associates of Washington, 1998), with all years adjusted to 1988-89 as the reference year. This means that the impact that changes in the purchasing power of college and university finances during this period may have had on changes in the level of the variables of interest has been factored out of the data, at least to the extent that the Higher Education Price Index represents an accurate estimate of actual price changes.

This analysis of relationships between the variables of interest begins with an inspection of two-variable correlation. This is followed by a discussion of multiple correlation between the predictor variables and reported levels of long term debt, and between the predictor variables and the ratio of long term debt to long term debt plus fund balance. The correlation matrix for all variables for all institutions combined is presented in Table 18. All two-variable correlations in this table and in the following correlation tables are presented as Pearson's r correlation. The maximum number of possible cases for all years combined including all institutions is 9,010. This is the number of colleges and universities reporting long term debt each year with all years

added together (see Table 3). For all private institutions for all years the maximum number of possible cases is 6,022, and for public institutions it is 2,988 (see Table 3).

In order to handle missing values for the two-variable correlation analysis and for the multiple regression analysis, the listwise missing values treatment option was applied in Statistical Package for the Social Sciences for MS Windows version 6.1.3 (Norusis, 1993). This approach eliminated all cases from the analysis that had a value missing on at least one variable. This method was justified because, due to the sizeable number of total cases, a sufficient number of cases was retained for analysis after eliminating cases with a missing value and, based on a review of the cases with missing data, their occurrence appeared to be random. This approach to handling missing values has the advantage that all correlations are calculated on the same cases, resulting in the same sample size for all comparisons, rather than having some values

Table 18
Intercorrelations Between Variables for All Colleges and Universities

Variable	1	2	3	4	5	6
1. Long term debt amount at year-end	--	.145*	.812*	.738*	.138*	.020
2. Ratio of long term debt to long term debt and fund balance		--	.021*	.011	.009	.105*
3. Total annual revenue			--	.559*	.159*	.019
4. Endowment value at year-end				--	.113*	.027*
5. Estimated replacement value of buildings and equipment					--	-.009
6. Year						--
M	$23,666.0	.154	$80,733.8	$58,456.7	$173,283.7	4.526
SD	$63,135.1	.142	$169,928.9	$254,210.3	$1,541,338.0	2.276
N	9,010	9,010	9,010	8,339	8,992	9,010

Note. Dollar amounts are in thousands.
*$p < .05$.

calculated on certain cases and some values on others, depending on which cases have missing values on each two-variable combination.

As shown in Table 18, for all institutions combined for all years the strongest bivariate correlation among all variables of interest was between total annual revenue and long term debt, followed by the relationship between endowment value and long term debt. The weakest relationships were between estimated replacement value of buildings and equipment and the ratio of long term debt divided by long term debt plus fund balance, on the one hand, and between estimated replacement value of buildings and equipment and reporting year, on the other hand.

As shown in Table 19, for private institutions as a whole the pattern is similar to all institutions combined, although for private institutions the correlation of both total annual revenue with long term debt and of endowment value with long term debt are

Table 19
Intercorrelations Between Variables for Private Colleges and Universities

Variable	1	2	3	4	5	6
1. Long term debt amount at year-end	--	.116*	.873*	.801*	.102*	.022
2. Ratio of long term debt to long term debt and fund balance		--	.049*	-.013	.011	.119*
3. Total annual revenue			--	.716*	.107*	.023
4. Endowment value at year-end				--	.104*	.027*
5. Estimated replacement value of buildings and equipment					--	-.012
6. Year						--
M	$19,582.2	.166	$54,349.1	$69,092.0	$139,395.3	4.526
SD	$58,999.1	.158	$145,852.4	$278,548.7	$1,855,722.0	2.274
n	6,022	6,022	6,022	5,931	6,007	6,022

Note. Dollar amounts are in thousands.
*$p < .05$.

slightly stronger than for all institutions as a whole. For public colleges and universities alone (see Table 20), the strongest correlations also were between total annual revenue and long term debt and between endowment value and long term debt. Here, however, the two were almost identical in strength but both lower than the same correlations for all private institutions. The two weakest two-variable correlations for all public institutions were between estimated replacement value of buildings and equipment and reporting year and between total revenue and reporting year, followed closely by reporting year and long term debt.

Table 20
Intercorrelations Between Variables for Public Colleges and Universities

Variable	1	2	3	4	5	6
1. Long term debt amount at year-end	–	.299*	.747*	.748*	.521*	.016
2. Ratio of long term debt to long term debt and fund balance		–	.065*	.109*	.054*	.071*
3. Total annual revenue			–	.433*	.656*	.015
4. Endowment value at year-end				–	.323*	.034
5. Estimated replacement value of buildings and equipment					–	.013
6. Year						–
M	$31,896.4	.129	$133,909.5	$32,261.3	$241,480.6	4.524
SD	$70,030.1	.098	$199,947.2	$178,156.2	$469,032.8	2.282
n	2,988	2,988	2,988	2,408	2,985	2,988

Note. Dollar amounts are in thousands.
*$p < .05$.

The two-variable correlation for each predictor variable versus the reported amount of long term debt for private and for public institutions by Carnegie institutional classification is listed in Table 21. A full intercorrelation analysis for each

Table 21
Correlation of Individual Predictor Variables with Long Term Debt

	Predictor Variable				
	Total Annual Revenue	Endowment Value at Year-End	Estimated Replacement Value of Buildings And Equipment	Year	Full Correlation Matrix
ALL INSTITUTIONS	.812*	.738*	.138*	.020	Table 18
PRIVATE INSTITUTIONS					
All	.873*	.801*	.102*	.022	Table 19
Baccalaureate	.774*	.673*	.049*	.074*	Table B1
Comprehensive	.802*	.496*	.042	.078*	Table B2
Doctoral	.812*	.555*	.008	.058	Table B3
Research	.687*	.687*	.391*	.067	Table B4
PUBLIC INSTITUTIONS					
All	.747*	.748*	.521*	.016	Table 20
Baccalaureate	.516*	.261*	.120*	.118*	Table B5
Comprehensive	.508*	.236*	.365*	.101*	Table B6
Doctoral	.795*	.424*	.101*	.048	Table B7
Research	.610*	.754*	.473*	.017	Table B8

*$p < .05$.

private Carnegie classification group is presented in Appendix B, Tables B1 through B4. For the public institutional groups, a full analysis is presented in Tables B5 through B8. In general, annual revenue and endowment value had the strongest relationships with long term debt for all groups, followed in order by estimated replacement value of buildings and equipment and by reporting year (see Table 21). However, the strength of the first two relationships is higher within each private institution classification group than it is within the public groups. On the whole, replacement value of buildings and equipment and reporting year had stronger

relationships among the public institution Carnegie groups than was the case for the private groups.

A summary of the bivariate correlation of each predictor variable with the second criterion variable of interest in this study, the ratio of long term debt to long term debt and fund balance, is presented in Table 22 by private and by public Carnegie

Table 22
Correlation of Individual Predictor Variables with the Ratio of Long Term Debt to Long Term Debt and Fund Balance

	Predictor Variable				
	Total Annual Revenue	Endowment Value at Year-End	Estimated Replacement Value of Buildings And Equipment	Year	Full Correlation Matrix
ALL INSTITUTIONS	.021*	.011	.009	.105*	Table 18
PRIVATE INSTITUTIONS					
All	.049*	-.013	.011	.119*	Table 19
Baccalaureate	-.007	-.051*	-.006	.115*	Table B1
Comprehensive	.223*	-.021	.003	.140*	Table B2
Doctoral	-.047	-.132*	.042	.072	Table B3
Research	.096	-.180*	-.152*	.224*	Table B4
PUBLIC INSTITUTIONS					
All	.065*	.109*	.054*	.071*	Table 20
Baccalaureate	.130*	.066	-.083	.118*	Table B5
Comprehensive	.021	-.006	.065*	.074*	Table B6
Doctoral	.304*	.105*	.067	.090	Table B7
Research	.284*	.284*	.250*	.003	Table B8

*$p < .05$.

institutional classification. The full intercorrelation analysis for each private Carnegie classification group is presented in Appendix B, Tables B1 through B4, and in Tables B5 through B8 for the public groups.

The highest correlations among the private institutional groups were on annual revenue for Comprehensive institutions and on reporting year for Research institutions (see Table 22). Among the public institutional groups, annual revenue for Doctoral institutions showed the highest correlation with the debt to debt plus fund balance ratio, followed by annual revenue and endowment value for the Research institutions. Each private institutional group's reported endowment value for all years of this study was negatively correlated with its debt to debt plus fund balance ratio, although the relationships were not strong.

As shown in Table 23, correlation between the two criterion variables, long term debt and the ratio of long term debt to long term debt and fund balance, generally was

Table 23
Correlation of Long Term Debt with the Ratio of Long Term Debt to Long Term Debt and Fund Balance

		Full Correlation Matrix
ALL INSTITUTIONS	.145*	Table 18
PRIVATE INSTITUTIONS		
All	.116*	Table 19
Baccalaureate	.190*	Table B1
Comprehensive	.454*	Table B2
Doctoral	.165*	Table B3
Research	.332*	Table B4
PUBLIC INSTITUTIONS		
All	.299*	Table 20
Baccalaureate	.750*	Table B5
Comprehensive	.613*	Table B6
Doctoral	.679*	Table B7
Research	.695*	Table B8

*$p < .05$.

higher within the public institutional categories than within the private institutional categories, yet all were statistically significant at a 95% level of confidence. Among the private institutional groups, the correlation was highest for comprehensive institutions, at .454, and lowest for baccalaureate colleges, at .116. For public institutions, the highest correlation was for baccalaureate colleges, at .750, whereas the lowest was for comprehensive institutions, at .613. A complete intercorrelation analysis for each private Carnegie classification group is presented in Appendix B, Table B1 through Table B4. For public groups the full analysis is presented in Appendix B, Tables B5 through B8.

Variation in Long Term Debt: Combined Influence of Predictor Variables

The purpose of analyzing the data in this study using multiple linear regression analysis was to assess the extent to which variation in the combination of the four predictor variables together had a linear relationship to variation in the amount of reported long term debt and to variation in the ratio of long term debt to long term debt and fund balance. Each regression analysis was performed by entering all predictor variables simultaneously, which means I did not specify minimum strength of variable contribution criteria either for including or for excluding a predictor variable.

Each summary of the results of regression analysis is followed by a summary of tests of four regression assumptions and conditions: (a) correlation among the predictor variables (collinearity, which will affect the results of the regression's underlying mathematical calculations and statistical tests of the significance of results); (b) the degree of independence and the distribution of residual values (differences

between the value of the criterion variable predicted by the regression equation and the actual value of the criterion variable); and (c) the possible presence of outliers and their influence on the results (Licht, 1995; Pedhazur, 1997; Tabachnick & Fidell, 1996). Table 24 summarizes guidelines for using tests in these areas to make judgements about possible violations of regression assumptions.

Table 24
Tests of Regression Assumptions and Guidelines for Use

Assumption/Condition	Test	Guideline
Non-collinearity of predictor variables	Tolerance	Values at or near 0.2 or below indicate high correlation of the variable with one or more other predictor variables.
	Variance inflation factor	Values at or above 4.0 indicate high correlation of the variable with one or more other predictor variables.
	Condition index	All values should be fairly close. The number of larger values may indicate that this number of predictor variables is highly correlated with one another.
Independence of residual values	Durbin-Watson test	Values at or near 2.0 indicate no relationship among residual values.
Normality of distribution of residual values	Plot of standardized residual values	The plot of residual values should be fairly close to or similar to a normal distribution plot.
Presence of outliers and their influence	Casewise plot of standardized residual values	Indicates the number of cases for which the standardized residual value exceeds +/- x number of standard deviations from the mean residual value.
	Centered leverage value	Identifies the number of cases with a calculated leverage value (degree of influence) on the results that exceeds the standard (centered) leverage value for all cases.

Using the four predictor variables to explain reported amount of long term debt for all colleges and universities for all years, the resulting coefficient of multiple determination, or R^2, is .7718, meaning these four variables together, in combination,

Table 25
Summary of Simultaneous Regression Analysis for Variables Predicting Long Term Debt for All Colleges and Universities (N = 8,325)

Variable	B	SE B	β	t
Year	-115,655.4898	148,756.0497	-0.0041	-0.777
Total annual revenue	0.2176	0.0023	0.5908	92.843*
Endowment value at year-end	0.1049	0.0017	0.3989	63.043*
Estimated replacement value of buildings and equipment	-3.6705E-5	2.1370E-4	-9.1150E-4	-0.172

Note. $R^2 = .7718$; adjusted $R^2 = .7717$; $F(4, 8320) = 7{,}033.13$ ($p < .05$).
*$p < .05$.

Table 26
Tests of Regression Assumptions on Variables Predicting Long Term Debt for All Colleges and Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9987	1.001
Total annual revenue	.6774	1.476
Endowment value at year-end	.6852	1.459
Estimated replacement value of buildings and equipment	.9741	1.027

	1	2	3	4	5
Condition index	1.000	1.460	1.633	2.540	4.856

II. Independence of residual values.

Durbin-Watson test statistic: 1.5363

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
	X

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 174

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .000480
Number of cases with centered leverage value exceeding two times the mean value: 388

account for or explain 77.18% of the variation in the reported amount of long term debt (see Table 25 and Table 26). Adjusted $\underline{R}^2$, or .7717, which is also shown, is $\underline{R}^2$ statistically adjusted for the number of cases in the analysis to give a more accurate estimate of what $\underline{R}^2$ will be for the entire population rather than just for the sample on which $\underline{R}^2$ is calculated (Tabachnick & Fidell, 1996). The $\underline{R}^2$ in this example, and therefore the adjusted $\underline{R}^2$, is statistically significant using the $\underline{F}$ distribution to test the hypothesis that $\underline{R}^2$ is equal to 0.000. In this example, and in all of the following reported regression analyses, this hypothesis is tested for significance using a 95% confidence level.

Although the regression of reported amount of long term debt for all colleges and universities on the four criterion variables produced a fairly high adjusted $\underline{R}^2$ value, only two of the criterion variables, annual revenue and endowment value, made a statistically significant contribution to explaining variation in long term debt (see Table 25). This table also shows that the relative weight of these two variables in the regression equation was .5908 for annual revenue and .3989 for endowment value, as indicated by each variable's standardized multiple regression coefficient (β value).

The results of a regression analysis of the relationship between the four predictor variables and level of long term debt for all private colleges and universities is summarized in Table 27 and Table 28. At .8200, adjusted $\underline{R}^2$ for all private institutions was larger than it was for all private and public institutions combined, indicating that these four predictors during the period under study explained more of the variation in reported debt for private colleges and universities than they did for all private and

Table 27
Summary of Simultaneous Regression Analysis for Variables Predicting Long Term Debt for Private Colleges and Universities (n = 5,918)

Variable	B	SE B	β	t
Year	3,427.2706	141,243.3913	1.3390E-4	0.024
Total annual revenue	0.2526	0.0031	0.6361	80.220*
Endowment value at year-end	0.0724	0.0017	0.3333	42.029*
Estimated replacement value of buildings and equipment	-5.9990E-6	1.7224E-4	-9.1150E-4	-0.035

Note. $R^2 = .8201$; adjusted $R^2 = .8200$; $F(4, 5913) = 6{,}740.20$ ($p < .05$).
*$p < .05$.

Table 28
Tests of Regression Assumptions on Variables Predicting Long Term Debt for Private Colleges and Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9985	1.002
Total annual revenue	.4837	2.067
Endowment value at year-end	.4837	2.068
Estimated replacement value of buildings and equipment	.9868	1.013

	1	2	3	4	5
Condition index	1.000	1.392	1.590	3.079	4.818

II. Independence of residual values.

Durbin-Watson test statistic: 1.9587

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
	X

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 112

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .000676
Number of cases with centered leverage value exceeding two times the mean value: 206

public institutions as a whole. As with all colleges and universities combined, the results show that only annual revenue and endowment value made a statistically significant contribution to the regression equation. Based on a comparison of standardized coefficient β values, the results show that annual revenue had a greater influence in explaining long term debt level for private institutions alone than for all institutions as a whole, whereas endowment value had a smaller influence.

For public institutions as a whole, the results of regression analysis for explaining variation in reported long term debt using the four predictor variables are presented in Table 29 and Table 30. Although the resulting adjusted $\underline{R}^2$ for public institutions is not as large as the adjusted $\underline{R}^2$ from the analysis for private institutions alone, it is slightly larger than the adjusted $\underline{R}^2$ for all private and public institutions combined (see Table 25). This suggests that the four predictor variables explain more of the variation in long term debt for private institutions and for public institutions as separate groups during the period under study than they do for both groups combined. As was the case for private institutions and for all institutions combined during this period, when all four predictor variables are analyzed together, only annual revenue and endowment value play a statistically significant role in predicting long term debt level for public institutions.

A regression analysis predicting long term debt level from the four predictor variables was carried out for each private and public Carnegie classification institutional group. A summary of the resulting adjusted $\underline{R}^2$ coefficients of multiple determination and β value standardized multiple regression coefficients is presented in

Table 29
Summary of Simultaneous Regression Analysis for Variables Predicting Long Term Debt for Public Colleges and Universities (n = 2,407)

Variable	B	SE B	β	t
Year	-507,978.9072	324,457.2106	-.0151	-1.566
Total annual revenue	0.1800	0.0047	.5078	38.067*
Endowment value at year-end	0.2260	0.0046	.5240	48.885*
Estimated replacement value of buildings and equipment	0.0021	0.0019	.0141	1.107

Note. $R^2 = .7769$; adjusted $R^2 = .7765$; $F(4, 2402) = 2{,}090.48$ ($p < .05$).
*$p < .05$.

Table 30
Tests of Regression Assumptions on Variables Predicting Long Term Debt for Public Colleges and Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9987	1.001
Total annual revenue	.5220	1.916
Endowment value at year-end	.8085	1.237
Estimated replacement value of buildings and equipment	.5755	1.738

	1	2	3	4	5
Condition index	1.000	1.671	2.232	3.522	5.438

II. Independence of residual values.

Durbin-Watson test statistic: 1.2984

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
	X

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 44

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .001660
Number of cases with centered leverage value exceeding two times the mean value: 106

Table 31
Summary of Results of Simultaneous Regression Analysis for Variables Predicting Long Term Debt

		Regression Equation Standardized Predictor Variable Coefficient (β)				
	Adjusted R^2	Total Annual Revenue	Endowment Value at Year-End	Estimated Replacement Value of Buildings And Equipment	Year	Full Analysis
ALL INSTITUTIONS	.7717*	.5908*	.3989*	-9.1150E-4	-0.0041	Tables 25 & 26
PRIVATE INSTITUTIONS						
All	.8200*	.6361*	.3333*	-9.1150E-4	1.3390E-4	Tables 27 & 28
Baccalaureate	.6191*	.6163*	.4391*	-0.0015	0.0151	Tables C1 & C2
Comprehensive	.6445*	.7600*	.0749*	-0.0076	-0.0022	Tables C3 & C4
Doctoral	.6696*	.7293*	.1485*	-0.0015	-0.0099	Tables C5 & C6
Research	.6168*	.4969*	.4569*	-0.0534	-0.0168	Tables C7 & C8
PUBLIC INSTITUTIONS						
All	.7765*	.5078*	.5240*	0.0141	-0.0151	Tables 29 & 30
Baccalaureate	.2079*	.3868*	.1523*	-0.0784	0.0914	Tables C9 & C10
Comprehensive	.3215*	.3881*	.0660*	0.2532*	0.0653*	Tables C11 & C12
Doctoral	.6528*	.7492*	.1317*	0.0124	-0.0226	Tables C13 & C14
Research	.7021*	.3822*	.6199*	0.0144	-0.0508*	Tables C15 & C16

*$p < .05$.

Table 31. Complete summaries of regression analysis results for each private Carnegie classification group are presented in Appendix C, Tables C1 through C8. For public institutions, full summaries of results are shown in Appendix C, Tables C9 through C16.

For each private Carnegie classification institutional group, the four predictor variables acting together explained over 60% of the variation in reported level of long term debt (see Table 31). For the public institution Carnegie classification groups, adjusted R^2 ranged from a high of .7021 for research universities to a low of .2079 for

baccalaureate colleges. As demonstrated by the standardized β value coefficients, annual revenue and endowment value had the most influence among the four predictor variables in explaining variation in long term debt for each private and public institutional group, with the exception of public comprehensive colleges and universities. In this group, reported estimated replacement value of buildings and equipment had more weight in the regression equation than endowment value.

Using the same four predictor variables, a series of regression analyses also were conducted for the second criterion variable in this study, which is the ratio of long term debt to the sum of long term debt and fund balance. In contrast to the analysis explaining variation in the level of long term debt, regression of the ratio of long term debt to debt and fund balance on the four predictor variables for all colleges and universities produced an adjusted $\underline{R}^2$ of only .0119 (see Table 32 and Table 33). This means that changes in the four predictor variables during the period under study, acting together, only shared slightly over 1% of the variation in the ratio of debt to debt plus fund balance.

Results for all private institutions as a whole and for all public institutions as a whole were similar. See Table 34 and Table 35 for a summary of the analysis for all private colleges and universities, and refer to Table 36 and Table 37 for the results using data from all public colleges and universities. For all private institutions, the adjusted $\underline{R}^2$ coefficient of multiple determination was .0221 (see Table 34), and for all public institutions it was .0197 (see Table 36).

A summary of regression analyses for examining variation in the ratio of long

Table 32
Summary of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for All Colleges and Universities (N = 8,325)

Variable	B	SE B	β	t
Year	0.0066	6.7340E-4	.1074	9.848*
Total annual revenue	2.3074E-11	1.0611E-11	.0288	2.175*
Endowment value at year-end	-3.5577E-12	7.5336E-12	-.0062	-0.472
Estimated replacement value of buildings and equipment	6.3313E-13	9.6740E-13	.0072	0.654

Note. $R^2 = .0124$; adjusted $R^2 = .0119$; $F(4, 8320) = 26.04$ ($p < .05$).
*$p < .05$.

Table 33
Tests of Regression Assumptions on Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for All Colleges and Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9987	1.001
Total annual revenue	.6774	1.476
Endowment value at year-end	.6852	1.459
Estimated replacement value of buildings and equipment	.9741	1.027

	1	2	3	4	5
Condition index	1.000	1.460	1.633	2.540	4.856

II. Independence of residual values.

Durbin-Watson test statistic: 1.7693

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 39

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .000480
Number of cases with centered leverage value exceeding two times the mean value: 388

Table 34
Summary of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Private Colleges and Universities (n = 5,918)

Variable	B	SE B	β	t
Year	0.0082	8.7853E-4	.1197	9.303*
Total annual revenue	1.3778E-10	1.9586E-11	.1300	7.034*
Endowment value at year-end	-6.2872E-11	1.0717E-11	-.1084	-5.867*
Estimated replacement value of buildings and equipment	8.2812E-13	1.0713E-12	.0100	0.773

Note. $R^2 = .0227$; adjusted $R^2 = .0221$; $F(4, 5913) = 34.35$ ($p < .05$).
*$p < .05$.

Table 35
Tests of Regression Assumptions on Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Private Colleges and Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9985	1.002
Total annual revenue	.4837	2.067
Endowment value at year-end	.4837	2.068
Estimated replacement value of buildings and equipment	.9868	1.013

	1	2	3	4	5
Condition index	1.000	1.392	1.590	3.079	4.818

II. Independence of residual values.

Durbin-Watson test statistic: 1.9698

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 26

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .000676
Number of cases with centered leverage value exceeding two times the mean value: 206

Table 36
Summary of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Public Colleges and Universities (n = 2,407)

Variable	B	SE B	β	t
Year	0.0032	8.0327E-4	.0813	4.025*
Total annual revenue	1.7780E-11	1.1708E-11	.0424	1.519
Endowment value at year-end	4.2350E-11	1.1445E-11	.0831	3.700*
Estimated replacement value of buildings and equipment	3.3790E-12	4.7382E-12	.0190	0.713

Note. $R^2 = .0213$; adjusted $R^2 = .0197$; $F(4, 2402) = 13.07$ ($p < .05$).
*$p < .05$.

Table 37
Tests of Regression Assumptions on Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Public Colleges and Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9987	1.001
Total annual revenue	.5220	1.916
Endowment value at year-end	.8085	1.237
Estimated replacement value of buildings and equipment	.5755	1.738

	1	2	3	4	5
Condition index	1.000	1.671	2.232	3.522	5.438

II. Independence of residual values.

Durbin-Watson test statistic: 1.4921

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 42

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .001660
Number of cases with centered leverage value exceeding two times the mean value: 106

term debt to long term debt plus fund balance based on variation in the four predictor variables, for each of the eight private and public Carnegie institutional classification groups, is presented in Table 38. Complete summaries of the results by private Carnegie classification group are presented in Appendix C, Table C17 through Table C24, with full summaries for each public institutional group in Appendix C, Table C25 through Table C32.

As shown in Table 38, the two largest adjusted $\underline{R}^2$ values by institutional group

Table 38
Summary of Results of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance

		Regression Equation Standardized Predictor Variable Coefficient (β)				
	Adjusted R^2	Total Annual Revenue	Endowment Value at Year-End	Estimated Replacement Value of Buildings And Equipment	Year	Full Analysis
ALL INSTITUTIONS	.0119*	0.0288*	-.0062	.0072	.1074*	Tables 32 & 33
PRIVATE INSTITUTIONS						
All	.0221*	0.1300*	-.1084*	.0100	.1197*	Tables 34 & 35
Baccalaureate	.0192*	0.0996*	-.1277*	-.0037	.1146*	Tables C17 & C18
Comprehensive	.0962*	0.3373*	-.2157*	-.0093	.1222*	Tables C19 & C20
Doctoral	.0173*	0.0442	-.1656*	.0362	.0917	Tables C21 & C22
Research	.1256*	0.2402*	-.2484*	-.1272	.2327*	Tables C23 & C24
PUBLIC INSTITUTIONS						
All	.0197*	0.0424	.0831*	.0190	.0813*	Tables 36 & 37
Baccalaureate	.0227*	0.0710	.0460	-.1160	.1111	Tables C25 & C26
Comprehensive	.0179*	5.6500E-4	-.0407	.1061*	.1053*	Tables C27 & C28
Doctoral	.0837*	0.2975*	-.0229	.0333	.0636	Tables C29 & C30
Research	.1269*	0.1976*	.2226*	.0343	-.0194	Tables C31 & C32

*$\underline{p} < .05$.

are .1256 for private research universities and .1269 for public research universities. This means that between 12% and 13% of the variation in the ratio of long term debt to long term debt plus fund balance during the period under study for these institutions was explained by the variation in the four predictor variables. Although this level of explanation was small, and each of the other individual groups had adjusted $\underline{R}^2$ values that were even smaller, in general the weight of the predictor variable reporting year in explaining variation was more substantial under the regression of the ratio of long term debt to debt plus fund balance (Table 38) than under the regression of long term debt level (Table 31). This is indicated by comparing the size of the standardized β value coefficients for the predictor variable year between the two tables. Even though all of the adjusted $\underline{R}^2$ values for the regression of the ratio of debt to debt plus fund balance on the predictor variables are statistically significant at a 95% confidence level (see Table 38), the resulting regression equations are of little practical value in explaining or predicting the ratio because the adjusted $\underline{R}^2$ values are not large.

Chapter 5 - Discussion

The inflation-adjusted value of long term debt increases from the late 1980s through the mid-1990s in private and in public institutions as a whole and in each four-year Carnegie institutional category. For this study, financial leverage due to long term debt is defined as long term debt in relation to fund balance accumulated from operating surpluses and from private and governmental gifts and grants. On the whole, financial leverage also increases among four-year institutions during this period. The mean level of long term debt at the institutional level for all years combined varies more directly with institutional revenue and endowment value than it varies with the value of buildings and equipment or fiscal year.

The association between the combined predictor variables of revenue, endowment value, replacement value of buildings and equipment, and reporting year, on the one hand, and level of outstanding debt, on the other hand, is substantially stronger than their combined association with degree of financial leverage. At the same time, however, within several Carnegie institutional categories there is moderate correlation between amount of long term debt and financial leverage.

Three perspectives for understanding the role of long term debt at the institutional level emerge from this study within the context of the related literature and the study's theoretical background. Institutional long term debt has important short term effects as well as long term implications. Four-year institutions in the private sector versus the

public sector and by Carnegie institutional category demonstrate both similarities and differences in patterns of debt and in debt's relationship to other financial variables. On the whole, the results of this study offer a perspective on long term debt's role in financing physical capital needs versus debt's evolving role in higher education institutional financial structure.

Short Term versus Long Term Implications of Long Term Debt

An institution faces substantial short term challenges and one-time expenditures when initiating a long term debt program or when issuing additional long term debt. These include developing or contracting for legal, financial analysis, and debt market analysis services to address regulatory, taxation, and financial strategy considerations in preparing for and issuing long term debt (Buehler, 1993; Forrester, 1988; Kalita, 1990; King et al., 1994; Klein, 1992; Sanders, 1992). Sturtz (1990) found that internal staffs in several large research universities in the mid 1980s were ill-prepared for the immediate challenges of handling complex long term debt management responsibilities and that few institutions had board-approved institutional debt policies. Libby (1984) documented the array of financial, legal, and regulatory paper work preparation that accompanies each bond issue in a large research university.

Short term financial consequences of a decision to issue debt include an immediate obligation to commit funds to repay debt principal and make interest payments. Another immediate consideration is the additional financial risk to the institution brought on by financial leverage. From the late 1980s through the mid 1990s, private institutions as a whole report increases in long term debt of slightly over

19% in inflation-adjusted dollars, and public institutions as a group report increases of almost 10%. During the same period, however, the number of institutions carrying debt in each group is fairly constant.

This upward trend over time suggests that institutions on the whole made a succession of decisions to increase commitments to debt service and increase financial risk at a time when resources in higher education became increasingly constrained by competition, by environmental demands to keep pace with a revolution in technology, and, among public institutions, by reduced governmental appropriations and increased demands for accountability (Breneman & Finney, 1997; Layzell & Caruthers, 1995). In spite of declining long term interest rates in the early 1990s (Hennigan, 1998), mean institutional principal and interest payments increase in price-adjusted terms in six of the eight Carnegie institutional sub-categories for private institutions and in five of the eight sub-categories for public institutions.

Traditionally, the use of long term debt is closely associated with capital outlay budgeting for buildings and equipment (Anthony, 1989; Robinson, 1986). Colleges and universities, however, often separate capital budgeting and financing from operational planning and budgeting (Adams, 1997; Dickmeyer, 1996; Dunn, 1989a). Debt service requirements tend to be treated as fixed commitments and taken off the table rather than be subjected to the give and take of the regular institutional budgeting cycle.

These debt-related practices have important implications for institutional governance, faculty involvement in decision making, and accountability to external constituencies. Many college and university financial administrators do not have the

technical and managerial expertise to deal with all aspects of issuing and managing long term debt (Sturtz, 1990). Individual faculty members, faculty committees, and other governance groups involved in the regular budget planning process may not be included in off-cycle decision making on resource allocation, such as deciding on commitments to debt service. Treating debt principal repayment and interest costs as fixed commitments that are not considered in the budget planning process also removes them from the budget review and communications activities that internal and external constituencies rely on for data on sources and uses of institutional resources.

Decisions to initiate or increase long term debt also have several long term implications. Long term debt is most often used to enable an institution to secure facilities, equipment, technology, and other high-cost items to enhance long term mission accomplishment and improve program quality in support of long term goals (Kaiser, 1987, 1996). It is an example of an area of institutional resource management where it is difficult to see the ramifications for each of several future years without extensive long term analysis and planning (Brinkman & Morgan, 1997).

The results of this study show that decisions made on long term debt by four-year institutions from the late 1980s through the mid 1990s have long term consequences for debt's relationship to other institutional financial variables and for institutional financial leverage, which is the relationship of debt to accumulated fund balance. Long term debt is used extensively during this period to acquire long-lived assets such as facilities and equipment. Yet, by the end of the eight year period under study compared to the first year, the ratio of replacement value of buildings and equipment to long term debt is lower for private institutions as a whole, lower for five of eight

Carnegie sub-categories for private institutions, and lower for four of eight public institutional sub-categories. A lower facilities and equipment to debt ratio suggests that increases in facilities and equipment value do not keep pace with increases in amount of outstanding long term debt, which means that debt grows in value faster than the primary category of assets that it is normally used to finance.

This study also found that, for all four-year private colleges and universities as a group and for all four-year public institutions, financial leverage due to long term debt was greater in 1995-96 than in 1988-89. At the Carnegie institutional sub-category level, the ratio is higher in the last year in each of the eight sub-categories for private institutions and in five of the eight sub-categories for public institutions. The correlation of fiscal reporting year with the leverage ratio for all institutions combined, at .105, is not strong, but it is positive and statistically significant (at the .05 confidence level), and it is by far the strongest predictor of leverage among the four predictor variables in this study.

An increase in financial leverage due to long term debt is an important long term implication for institutional finance. Although it may indicate appropriate use of untapped institutional debt capacity (Forrester, 1988), a wise investment in the future, and a degree of strategic resource deployment (Brinkman & Morgan, 1997), it also indicates an overall increase in institutional financial risk, which is the requirement to meet fixed, legal financial commitments regardless of revenue fluctuations (Weston & Brigham, 1981).

The evidence on increasing financial leverage throughout the 1990s found in this study parallels indications in the literature that a growing number of institutions are

subject to external scrutiny by credit rating agencies establishing and revising institutional credit ratings rather than just individual debt issue ratings ("Positive Outlook," 1998; "Standard and Poor's Private," 1997). Study findings on increasing financial leverage among public institutions mean that public institutions, as well as private institutions, either are establishing or enhancing internal efforts to maintain credit-worthiness, in order to keep to a minimum the chances that taking on more debt will jeopardize future credit ratings and thus increase interest cost on future debt (Fitch IBCA, 1998a, 1998b; Sandridge, 1998).

Similarities and Differences Between Institutional Groups

Previous studies examined relationships between sources of institutional finance and institutional structure and mission. For private colleges and universities, Geiger (1986) argued that an institution's relative mix of support from tuition, federal research funding, and private gifts fairly closely follows institutional mission. He found differing funding arrangements for selective, research-oriented universities versus comprehensive, multipurpose, community-oriented urban universities versus focused, selective, undergraduate liberal arts colleges.

Tolbert (1985), on the other hand, analyzed relationships between different levels of public and private institutional funding and the organizational structure, location, and assigned responsibilities of institutional fund raising and governmental relations units. At a more general level, Hansmann (1987) outlined the most prominent economic theories explaining the roles and purposes of different sources of financial support for nonprofit enterprises in relation to missions and objectives. He also

distinguished between the finances and missions of private nonprofit versus public nonprofit organizations.

These works suggested that institutional finances may be differentiated and analyzed by studying variations among institutional types, but none of them specifically addressed the role of long term debt. In addition, Geiger (1986) used only two years of financial data and Tolbert (1985) based her study on only one year of data. This limited their ability to account for and explain any change in institutional financial patterns over time. Furthermore, the two most recent in-depth, empirically-based studies (Libby, 1984; Sturtz, 1990) of college and university long term debt focused only on a very limited number of large research universities.

The present study controls for private versus public institutional governance and controls for institutional size and mission by analyzing source data by private versus public sector within Carnegie higher education institutional categories for all four-year institutions. This study also provides for longitudinal as well as cross-sectional analysis because the source data cover an eight year period. Although the proportion of total debt held by private versus public institutions as a whole shifts by only two percent between the first and last years, institutional differentiation nonetheless is very evident because the percentage increase in mean amount of debt is substantially higher in the baccalaureate and comprehensive categories for both private and public institutions than it is for other institutional groups.

Other relationships identified in the study also are found to differentiate the baccalaureate and comprehensive institutions as a whole from other categories. On the one hand, the overall strength of the regression coefficient of multiple determination

(adjusted $\underline{R}^2$) using the four combined predictor variables to predict debt level for private baccalaureate and private comprehensive institutions is similar to that for private research institutions. In contrast, revenue level alone correlates highly with debt level for the private baccalaureate and comprehensive institutions, whereas endowment level is a relatively stronger predictor of debt level for private research institutions.

Like their private counterparts, public baccalaureate and comprehensive institutions have a high percentage change in mean long term debt level for the last year over the first year. However, they are quite distinct from the private baccalaureate and comprehensive groups in the degree to which the predictor variables correlate with level of long term debt. Their regression coefficients of multiple determination (adjusted $\underline{R}^2$) for explaining variation in long term debt by variation on the four combined predictor variables are statistically significant but substantially weaker than those for the private baccalaureate and comprehensive institutions.

The bivariate correlation values between annual revenue and long term debt and between endowment value and long term debt also are markedly smaller for the public baccalaureate and comprehensive categories than they are for the private categories. At the same time, bivariate correlation between replacement value of buildings and equipment and amount of debt is higher for these two public groups than it is for the private baccalaureate and comprehensive institutions. On the whole, by the end of the period under study, the higher growth rate in mean amount of long term debt among both private and public baccalaureate and comprehensive institutional groups results in

leverage ratios almost as high as if not higher than the research institutions in their respective private and public sectors.

The results of this study confirm the importance of controlling for private versus public institutional governance and controlling for institutional mission in analysis and interpretation of finance data in American higher education. By taking this approach, this study not only validates the institutional differentiation model (Geiger, 1986; Tolbert, 1985) but shows that longitudinal comparisons over several years add richness and depth to the differentiation model. This study also demonstrates that expanding the analysis to baccalaureate and comprehensive institutions, which often are neglected in institutional and finance studies in higher education, enhances the existing body of knowledge on the use of long term debt in institutional finance because prior studies (Libby, 1984; Sturtz, 1990) of debt in higher education concentrated primarily on large research universities.

Long Term Debt in College and University Institutional Finance

The results of this study provide insight into the role of long term debt in higher education institutional finance in the 1990s. Previous studies of the role of long term debt in college and university finance concentrated primarily on needs for debt, usually physical plant facilities and other long-lived tangible assets (Adams, 1997; Dunn, 1989a, 1989b; Kaiser, 1987, 1996) or on the process and techniques for issuing and managing debt (Forrester, 1988; King et al., 1994; Klein, 1992). Previous work on the amount of debt actually held by colleges and universities primarily addressed the volume of debt issued. This approach disregards the net amount of debt outstanding

and the size of debt in relation to other financial elements, after adjusting for debt replacement through refinancing and after eliminating debt that has been fully paid off (Hennigan, 1998; King et al., 1994; Libby, 1984; Sturtz, 1990).

Robinson (1986) pointed out the important but often over-looked distinction between physical assets capital and financial assets capital in institutional strategic analysis and planning. Robinson argued that, though related, the two require different sets of conceptual, analytical, and management tools. In a similar vein, Anthony (1989) pointed out that accounting practices and terminology related to physical asset value measurement versus accounting for financial value in the nonprofit sector need to be brought more into conformity with standard practice in the profit-oriented business sector. In contrast to the primary emphasis of much of the literature on long term debt among colleges and universities, the present study follows Robinson and Anthony and argues for the distinct importance of studying long term debt as a key financial variable within the overall institutional financial structure.

Massy (1987, 1996) and Hornfischer (1996) emphasized the role of long term debt in strategic financial planning and decision making rather than its role simply as a tool for acquiring physical assets. Massy contrasted the use of long term debt to the use of accumulated endowment reserves and other fund balances for long term purchases. He pointed out that long term debt leverages other fund balances. This means that long term debt enables the institution to acquire long term assets without expending financial reserves, thus freeing these reserves, or income earned on them, for operational program support.

Debt capacity, according to Massy (1987, 1996) and Forrester (1988), is measured by the back-up financial strength afforded by existing fund balances in relation to the size of any outstanding debt and by ability to cover debt service principal repayment and interest obligations from current revenue. In addition, strategic management concerns surrounding debt planning, according to Massy, include controlling debt growth to an appropriate rate over time and maintaining a reasonable balance between debt level, endowment fund balance, and operating fund balance.

In addition to leveraging fund balances, Massy (1987, 1996) believed debt has other advantages. Debt planning adds predictability to forecasting the amount and timing of additional funds compared to the uncertainty of relying solely on gifts and changes in operating reserves. Through the process of credit rating and the determination of interest costs based on market rates and credit rating, debt also provides some external, market-based check for assessing an institution's actual cost of financial capital and debt capacity. Writing in the mid 1980s, Massy (1987) concluded that changes in federal regulations governing the use of long term debt by nonprofit organizations and trends toward increasing resource constraints facing colleges and universities would mean an increased use of long term debt by higher education institutions in the 1990s, with resulting increased financial leverage ratios and financial risk.

The present study finds clear evidence that four-year colleges and universities as a whole increase their use of long term debt throughout the 1990s and increase financial leverage as a result, as Massy (1987) predicted. There is also evidence to

suggest that the role of long term debt financing is not tied solely to long term physical capital financing needs.

The mean level of long term debt in price-adjusted terms increases over the years under study both for private and for public institutions as a whole and in all but two Carnegie institutional sub-categories. However, the reported mean ratios of replacement value of buildings and equipment to amount of long term debt show no similar consistency. A lower buildings and equipment to debt ratio in the eighth year of the study compared to the first, for example, means that long term debt increased more over the period than the value of buildings and equipment. For private institutions, the mean ratio is lower in five of eight Carnegie sub-categories in the last year compared to the first, whereas for public institutions the ratio is lower in four of the eight sub-categories.

The results of the correlation and multiple regression analyses in the present study tend to support a similar conclusion. Among the bivariate correlations of predictor variables with amount of long term debt, the level of annual revenue shares over 76% of its variation with amount of long term debt among all private institutions, whereas the shared variation between revenue level and long term debt is just under 56% for all public institutions. The shared variation of endowment level with amount of long term debt is 64% for all private institutions and 56% for all public institutions. In contrast, the level of long term debt shared only about 1% of its variation with replacement value of buildings and equipment in all private institutions and only about 27% in all public institutions.

In the multiple regression analyses using the four predictor variables combined to predict long term debt level for all years, fairly large adjusted $\underline{R}^2$ values are found for all private institutions combined and for all public institutions combined. However, an examination of the standardized β coefficients for these equations shows that the coefficients for replacement value of buildings and equipment are not significant statistically ($\underline{p} < .05$) and are very small in β value weight compared to annual revenue and to endowment value, which are both statistically significant ($\underline{p} < .05$).

Massy (1987, 1996) noted that debt capacity in colleges and universities is related to an institution's ability to cover debt service principal and interest obligations from current revenue and related to the size of other sources of permanent financing, primarily endowment balance. Massy argued that endowment balance enhances debt capacity by providing a potential source of financial collateral for long term debt and by presenting the necessary financial cushion to cover financial risk due to long term debt, which is the risk accompanying the requirement to cover fixed principal and interest requirements regardless of revenue fluctuation.

The results of this study show that, on the whole, increases in mean principal and interest payments parallel increases in mean debt levels over the period under study. For private institutions, mean payments in price-adjusted terms increase in six of eight Carnegie institutional sub-categories and in five of eight public institutional sub-categories. On the other hand, when ratios of total revenue to principal and interest payments in the last year of the study are compared to those in the first year, the picture is more mixed. For private institutions, the mean ratio in the last year is lower in five

of eight Carnegie institutional sub-categories. For public institutions, the last year's mean ratio is lower than the first in only three of the eight sub-categories.

A lower revenue to principal and interest ratio indicates that revenue was lower in the last year in relation to debt service requirements than it was in the first year. As an indicator of an institution taking advantage of its debt capacity in Massy's (1987, 1996) terms, lower ratios in the last year suggest that more debt capacity was being used by the institutions in these groups on the average by the mid 1990s than was the case in the late 1980s.

Massy (1987, 1996) also believed that debt capacity, in general, varies with level of endowment. This is because endowment can be an important basis of an institution's ability to cushion the financial risk involved in taking on long term debt and committing to fixed amounts of debt service payment. The results of this study show that while there is a fairly strong, positive, and statistically significant one to one relationship between amount of long term debt and year-end endowment value for private institutions as a whole and for all public institutions as a group, there are substantial differences in strength of correlation within Carnegie institutional classification groups for both private and for public institutions.

In general, there is more similarity in strength of correlation between endowment level and long term debt for the private institutional groups than for the public groups. At the same time, for the private groups, the strength of correlation in the baccalaureate category and in the research category are the two strongest and quite similar in strength. In contrast, the strength of correlation between endowment and long term debt within the public institutional groups is substantially lower than that for the

private groups. The exception is the public research institutional group, which has a higher correlation on these two variables than any private institutional group.

Viewed together with findings on change in mean debt level by Carnegie institutional category, the evidence on correlation of long term debt level and endowment level has several implications. The fastest growing debt levels in the period under consideration are in the baccalaureate and comprehensive institutions in both the private and public sectors. This suggests that these four institutional groups are under the most pressure to meet enrollment demands and upgrade facilities and technology during this period. They turned to long term borrowing in response.

At the same time, there is substantial variation among private and public baccalaureate and comprehensive institutions in the strength of the relationship between long term borrowing and endowment level. The strongest of the four is in the private baccalaureate category, which has somewhat over 45% of the variation in long term debt related to variation in endowment. This is only slightly lower than the strength of correlation on these two variables for private research institutions.

The next strongest correlation between endowment level and long term debt among baccalaureate and comprehensive institutions is that for private comprehensive institutions. For this group, however, these two variables have only about 25% for their variation in common. Even though public baccalaureate and public comprehensive institutions have the two highest growth rates on mean amount of long term debt among all four private and all four public Carnegie institutional categories, they have the two lowest correlation levels between long term debt and endowment.

These findings suggest that even though baccalaureate and comprehensive institutions have the highest growth in long term debt, the role of long term debt in strategic financial planning, decision making, and financial structure varies substantially among the two private and two public categories. Private institutions, even at this level, rely more heavily on endowment growth to cushion financial risk related to debt than public institutions with similar missions. In contrast, public institutions at this level depend more heavily on revenue growth.

Study results on ratios of revenue to principal and interest payments complement findings on endowment and debt level for baccalaureate and comprehensive institutions. By 1995-96, the mean ratio of revenue to principal and interest is higher for public institutions than for private institutions in the Baccalaureate I, Comprehensive I, and Comprehensive II institutional sub-categories.

In contrast to debt level, which is a direct measure of dollar amount, financial leverage is a relative measure because it is a comparison of debt level to other financial variables which are subject to change. An increase in long term debt does not necessarily mean an increase in financial leverage. The measure of financial leverage used for this study is the level of debt compared to other permanent sources of financing, such as fund balance generated by outside gifts, grants, and surplus from operations. If these sources of financing change at the same rate or at a greater rate than amount of long term debt, then leverage will remain the same or decrease rather than increase.

Although increases in long term debt do not always result in increased financial leverage, the results of this study show that mean leverage ratios on the whole for four-

year institutions, as measured by the ratio of debt to debt plus fund balance, increase over the period under consideration. This is the case for private institutions as a whole, for public institutions as a whole, for each of the eight Carnegie institutional sub-categories among private institutions, and for five of the eight public institutional sub-categories.

Although Massy (1987) predicted an increase in long term borrowing and an increase in financial leverage among colleges and universities in the United States, he wrote primarily from the point of view of private institutional finance in large research universities. He may not have anticipated the sustained level of increase in the use of long term debt among both private and public institutions at all levels that occurred during this period. In particular, the present study documents a notable growth rate in amount of debt during the 1990s among baccalaureate and comprehensive institutions and identifies debt's distinct pattern of relationships with other financial variables among these two Carnegie institutional categories.

On the whole, this study finds a much closer relationship between the predictor variables of interest and long term debt level than is the case between the predictors and degree of financial leverage. The predictors used in the study are annual revenue, endowment value, replacement value of buildings and equipment, and fiscal reporting year. The weaker relationship of the predictors to the financial leverage ratio could be explained partly by the role of fund balance in the computation of the ratio.

The leverage ratio, which is debt level divided by debt level plus fund balance, is dependent on the value of the fund balance calculation in the denominator. Fund balance as measured in this study is current fund balance plus endowment fund balance

plus book value of buildings and equipment. The lack of a stronger correlation between the predictor variables and leverage could be due to the level and direction of change in the variables making up fund balance. Perhaps it is changes in these variables that are offsetting changes in the predictor variables and preventing stronger correlation of the predictors with the leverage ratio. Further analysis and exploration of this possibility is needed before firm conclusions can be developed.

Although the predictors do not vary strongly with the financial leverage ratio, a bivariate correlation analysis between long term debt and financial leverage by Carnegie institutional classification category yields some fairly strong correlations within some groups. The strongest correlations are among the public institutional groupings, especially for baccalaureate institutions, followed closely by research and doctoral institutions.

The general tendency for public institutions to show stronger correlation between debt level and leverage than private institutions deserves additional future theoretical consideration and data analysis. One possible explanation is that the use of long term debt by private institutions is more an ongoing part of established financial practice than is the case with public institutions. If this is the case, increases in debt will tend to have more of an immediate relative impact on financial structure among public institutions than among private institutions.

Another part of the explanation may be that, to acquire debt, private institutions must demonstrate debt capacity by having an appropriate accumulated level of fund balance, which will tend to keep their leverage ratio lower in relation to debt. The debt of public institutions, on the other hand, is often backed by state governmental entities

rather than just institutional fund balances. With debt capacity defined by factors other than just fund balance, public institutions will tend to have higher leverage ratios than private institutions.

An important finding of this study is that the four predictor variables together tend to be more strongly related to amount of long term debt for private institutions than for public institutions at all institutional levels. This is important especially in view of the finding that there is relative consistency in the strength of combined prediction among all Carnegie groups for private institutions, whereas there is little consistency of combined prediction among Carnegie groups for public institutions.

This finding seems to corroborate Massy's (1987, 1996) and Hornfischer's (1996) premise that private institutions in general, regardless of mission and size, face similar strategic financial planning considerations regarding the trade off between size of endowment balance versus the use of long term debt. At the same time, however, the multiple regression analyses of long term debt on the predictor variables show that the standardized coefficient β value weight for endowment in the prediction equations for private baccalaureate and private research institutions is substantially higher than in the prediction equations for private comprehensive and private doctoral institutions.

This indicates that private institutions are not all alike and may parallel Geiger's (1986) finding that the more urban-oriented, multipurpose private institutions rely more heavily on non-endowment financial resources. The Carnegie institutional groups of comprehensive and doctoral institutions tend to line up more closely to the urban-oriented, multipurpose institutional classifications used by Geiger than do the Carnegie private baccalaureate and private research institutions.

Another noteworthy result of the present study is the similarity found between the strength of prediction in the regression equation of long term debt in public research institutions, on the one hand, and the results found for private institutions in general. The strength of prediction for public research institutions is noticeably closer to the result for each of the private institutional categories than it is to other public institutional categories. Considering the combined strength of prediction of long term debt in each of the four private and each of the four public institutional categories, the highest adjusted $\underline{R}^2$ coefficient and highest β standardized predictor value for endowment is in the public research institutional category. This finding supports the notion that large public research institutions in the United States are becoming indistinguishable on many dimensions from large private research institutions.

Study Contributions and Needs for Further Research

The present contributes to an understanding of the role of long term debt in college and university institutional finance through its comprehensive scope and through the methods used to organize, analyze, and summarize source data. The study's guiding conceptual model of the financial economics of the nonprofit organization establishes a suitable framework for interpreting data on institutional long term debt and the context of related financial variables. The conceptual model serves as an appropriate reference for linking in a meaningful way the study's analytical methods, including trend analysis, ratio comparisons, and bivariate and multivariate correlation analysis of financial variables.

The study's validity depends on the quality of the source data and on the suitability of the analytical tools to the overall purpose of the study. The strengths of the annual Finance Survey data collected and maintained by the National Center for Education Statistics, Integrated Postsecondary Education Data System (Broyles, 1995), include: comprehensive coverage of American institutions of higher education, consistent data element categories from year to year, and standardized data collection, follow-up, and editing procedures.

One shortcoming is that variations in institutional governance, organization, and financial record-keeping and reporting practices result in some inconsistency in the underlying meaning of reported data. Also, differences in external regulation, oversight, and sources of financial support between private and public institutions, and between public institutions in different states, place some limits on data comparability. Although institutions are required to report financial data to the Integrated Postsecondary Education Data System as a condition of eligibility for federal student financial aid programs, for various reasons all institutions do not respond in all data categories in all years.

The research design and data analysis methods in this study support exploration of the research questions. During the process of seeking answers to these guiding questions, three interpretive themes emerged--short term versus long term implications of long term debt, differentiation in long term debt characteristics among institutions of various missions and sizes, and the importance of the role of long term debt in institutional financial structure.

The design of this study allows both cross-sectional and longitudinal analysis of these issues. The design also enables analysis of multiple dimensions of long term debt financing. The multiple dimensions appropriate to this study are the level of principal and interest payments, amount of debt in relation to the value of long term assets, such as buildings and equipment, and debt level in relation to other accumulated sources of long term financing, such as fund balance.

At the same time, however, some of the measures of the financial variables used in this study are not ideal. Due to a change in Integrated Postsecondary Education Data System Finance Survey reporting requirements on plant fund balance mid-way through the period under study, for all years I substituted reported book value of buildings and equipment in the calculation of total fund balance rather than use plant fund balance.

In addition, responses provided by institutions to the annual Finance Survey on one of the predictor variables, replacement value of buildings and equipment, are estimated by the responding institutions. This is because there is no standard, universally accepted method or formula for measuring replacement value of buildings and equipment. The quality of building and equipment values record-keeping, as well as methods of estimation, vary from institution to institution. These factors also should be considered in assessing the reliability of the data used in this study for building and equipment value.

Based on their examination of long term debt decision making in large research universities, Libby (1984) and Sturtz (1990) observed that debt commitments typically were made outside of the institutional budgeting cycle and strategic planning process.

They also noted that written, institution-wide, governing board-approved policies on long term debt and debt limits were the exception rather than the rule.

The present study found a substantial increase in the total amount of long term debt held, and in the mean amount of debt, among four-year institutions from the late 1980s through the mid 1990s, especially in the Carnegie baccalaureate and comprehensive institutional groups. This finding suggests that research is needed to determine to what extent changes in institutional processes may have occurred to integrate long term debt strategy development with comprehensive strategic planning and to elevate it to the governing board policy level following the Libby (1984) and Sturtz (1990) studies. In view of the relatively high growth rate in debt found in this study among baccalaureate and comprehensive institutions, it will be important to focus this research not only on the larger research institutions but also on baccalaureate and comprehensive institutions.

The analysis in the present study of the short term impact as well as the long term effect of debt on the financial variables of interest underlines the importance of timing in gauging the role of long term debt in the context of overall institutional financial structure. Variation in the predictor variables used in this study are not only related to the level of long term debt in the same time period as the predictors are measured but may be related even more strongly to debt level in future periods. The association of current variation in the predictors to future levels of debt might be different than the level of association within the same period. The present study compares differences in the variables of interest by time period, or reporting year. A worthwhile focus of future research will be to compare change in the predictor variables of revenue level,

endowment level, and value of buildings and equipment in one period with change in long term debt level and other variables of interest in later periods.

Based on their review of fiscal planning and allocation strategies in colleges and universities, Brinkman and Morgan (1997) contended that the institutional reality of resource limitations serves two short term and three long term organizational functions. In the short term, they argued, resource allocation responds to production needs and program support cost requirements, and it imposes a degree of operating efficiency. In the longer view, the act of allocation supports strategic resource deployment, provides for investments in the future, and preserves institutional assets.

Further research on college and university long term debt strategy formulation and decision making might use the points from Brinkman and Morgan's (1997) functional resource allocation framework to assess interconnections in institutional practice between resource allocation and the long term debt mechanism. These points also could be used to evaluate the degree to which long term debt financing is perceived by institutional decision makers as serving the goal of efficiency or effectiveness or both.

Knowledge of the role of long term debt in institutional finance and in strategic management also could be further advanced by theoretical development and by more empirical work on whether the increasing use of long term debt is a centralizing, balancing phenomenon in institutional management or a centrifugal, destabilizing force (Zemsky & Massy, 1995). Likewise, the work of Tolbert (1985) and others on institutional environments and external resource dependence suggests that our understanding of the role of debt could be extended by more theoretical work and data

gathering on the particular characteristics of the resource dependencies versus the internal policy formulation and political tradeoffs associated with initiating or adding to institutional long term debt. Some institutional case summaries already appearing in the literature (King et al., 1994) can serve as a starting point.

Long term debt in higher education institutional finance is understood traditionally as a mechanism for financing long term, capital intensive, physical plant facilities. The goal of the present study was to assess the role of long term debt in four-year college and university institutional finance in the United States from the late 1980s through the mid 1990s. Private and public colleges and universities at all levels during this period faced considerable resource constraint, increased competition for students, and growing demands for accountability from governmental funding agencies and other external stakeholders.

During these years, new forces influenced the instructional and research process at all levels. Resource limitations forced a transition to new production technologies. Enrollment growth and increasing student diversity challenged traditional academic values, goals, and methods of instructional delivery. Expectations that instruction should meet the needs of a growing number of non-traditional students and that instruction and research should benefit state economies and business development encouraged an ongoing reassessment of how and where long term capital facilities and equipment should be deployed in support of academic missions.

Although this period was one of substantial stress, challenge, and transition in American higher education, the present study documents substantial growth in the mean amount of long term debt held by four-year colleges and universities of all

missions and sizes. By analyzing underlying source data, this study also demonstrates that financial leverage and related financial risk due to long term debt increased in virtually all private and public Carnegie institutional categories. This study, therefore, fulfills the purpose of increasing understanding of the role of long term debt in institutional finance at all institutional levels and shows that long term debt continues to play an important, expanding, and increasingly complex role in college and university finance.

Recommendations

There are several applied uses for the results of this study and some practical implications in the findings. Federal tax and regulatory policies restrict the use of tax exempt long term debt by nonprofit organizations (Clapp, 1987). Individual state policies provide for debt limits on public higher education institutions as well as on private colleges and universities which borrow through state lending authorities (King et al., 1994; Klein, 1992).

These federal and state policies together aim to achieve a balance between providing these organizations with reasonable opportunities for making use of the financing mechanism afforded by debt and limiting the amount of government tax revenue lost through the tax exemption on interest income to the lender. In addition, debt issue policy limitations aim to discourage borrowing organizations from taking on debt in excess of their ability to handle principal repayment and interest obligations.

The results of the present study should be compared to desired or anticipated regulatory policy results during the late 1980s through the mid 1990s in order to assess

whether actual experience with debt in relation to other contextual variables, as documented in this study, turned out to be in line with federal and state policy intent. Specific types of data presented in this study that might be used in such a review include the level of principal and interest payments, principal and interest payments in relation to revenue and other financial indicators, and debt level in relation to total sources of long term financing.

The data analysis and results from the present study should be used by regional and national higher education professional associations, potentially in a number of ways, to assess needs in the area of debt management practices and needs for information dissemination and professional staff development in colleges and universities. The results are organized not only to show debt level and trends in total but also to show differences among Carnegie institutional classification groups. Professional associations should use the results, for example, to evaluate college and university business practices and trends in the areas of debt strategy planning and implementation. This evaluation could be used as one basis for any necessary reorientation in the focus, emphasis, or content of policy forums, training and development programs, and publications sponsored by these associations and interest groups.

Professional associations and other leaders with responsibility for the continuing viability of higher education also potentially should be concerned about the overall increase in financial leverage and financial risk among institutions at all levels, as found in the present study, from the late 1980s through the mid 1990s. Policy questions and issues related to these developments should be identified, reviewed and

addressed. Examples are whether this increase in financial leverage will place some institutions under an unmanageable risk of not being able to cover fixed principal and interest payment obligations should a general economic downturn occur in the near future, and whether institutions on the whole, or in particular Carnegie institutional classification segments, already have over-extended their debt repayment commitments and jeopardized their existing reserves of debt capacity.

Higher education professional associations, as well as researchers in the areas of higher education facilities needs and capital planning, should use the results of this study to enhance understanding of existing perspectives on the question of college and university facilities requirements. Several studies (Kaiser, 1987, 1996; Rush & Johnson, 1989) during the period covered by the present study documented deferred facilities maintenance backlogs and identified substantial new and replacement facilities needs among a broad spectrum of American institutions of higher education.

The present study, on the other hand, shows that total debt, and debt in relation to total sources of long term financing, increased among all four-year institutional sectors during the period. The findings of the facilities needs studies should be revisited from the point of view of whether the gap documented in these studies was, in fact, narrowed somewhat by additional debt financing of new and replacement facilities during this period or whether the trend toward increased maintenance backlogs and replacement facilities problems continued undiminished into the mid to late 1990s in spite of the increase in mean debt level among all institutions.

Data on trends in mean inflation-adjusted debt level and in mean financial leverage due to long term debt by Carnegie institutional classification, as developed in

the present study, should be made available to individual institutional financial analysts and planners. Staff personnel and executive decision makers at the institutional level then could compare data on their own institution to mean data from this study for their Carnegie institutional group. This could be a part of a strategic assessment of how the institution's use of debt, and debt in relation to other key elements in its financial structure, compares to its Carnegie group as a whole. This type of comparative analysis would provide one indicator to an institution of whether it may be over-extended in its use of debt or whether it may need to consider using more debt for capital improvements and additions, as one way of making maximum use of its other, non-debt financial resources.

The staff of the National Center for Education Statistics should consider reviewing the survey response element in the Integrated Postsecondary Education Data System Finance Survey (Broyles, 1995) used to collect institutional data on long term debt. Presently, data on outstanding long term debt is collected only through the data item, "indebtedness on physical plant - balance owed on principal at end of year."

Although the greatest amount and proportion of long term debt is still issued by colleges and universities for "physical plant" projects, the literature review (Massy, 1987, 1996; Tommaney, 1994) for this study indicated that a growing amount of long term debt is issued for other purposes, such as funding student loan reserves and financing internal institutional loan funds undesignated for specific projects.

Physical plant long term debt represents only the debt that is recorded in the "physical plant fund" on college and university financial statements (Johnson, 1994; Wainwright, 1992). Staff personnel of the National Center for Education Statistics

should consider adding other categories to the Finance Survey for reporting long term debt. This would mean that the institutional survey data could include a picture of outstanding institutional long term debt broader than just that represented by physical plant.

Appendix A

Definition of Selected Carnegie Higher Education Institutional Classification Categories

Definition of the Carnegie institutional classifications for higher education (Carnegie Foundation for the Advancement of Teaching, 1994) used in this study.

The 1994 Carnegie classification included all colleges and universities in the United States that were degree-granting and accredited by an agency recognized by the United States Secretary of Education.

Major classification:	**Baccalaureate colleges** Primarily undergraduate colleges with major emphasis on baccalaureate degree programs.
Sub-category:	Baccalaureate colleges I Award 40% or more of their baccalaureate degrees in liberal arts fields and are restrictive in admissions.
Sub-category:	Baccalaureate colleges II Award less than 40% of their baccalaureate degrees in liberal arts fields or are less restrictive in admissions.

Major classification:	**Comprehensive colleges and universities** Offer a full range of baccalaureate programs and are committed to graduate education through the master's degree.
Sub-category:	Comprehensive colleges and universities I Award 40 or more master's degrees annually in 3 or more disciplines.
Sub-category:	Comprehensive colleges and universities II Award 20 or more master's degrees annually in 1 or more disciplines.

Major classification: **Doctoral universities**
Offer a full range of baccalaureate programs and are committed to graduate education through the doctorate.

Sub-category: Doctoral universities I
Award 40 or more doctoral degrees annually in 5 or more disciplines.

Sub-category: Doctoral universities II
Award 10 or more doctoral degrees annually in 3 or more disciplines or award 20 or more doctoral degrees annually in 1 or more disciplines.

Major classification: **Research universities**
Offer a full range of baccalaureate degrees, are committed to graduate education through the doctorate, and give high priority to research.

Sub-category: Research universities I
Award 50 or more doctoral degrees annually and receive $40 million or more annually in federal support.

Sub-category: Research universities II
Award 50 or more doctoral degrees annually and receive between $15.5 million and $40 million annually in federal support.

Appendix B

Correlation Tables

Table B1
Intercorrelations Between Variables for Private Baccalaureate Colleges

Variable	1	2	3	4	5	6
1. Long term debt amount at year-end	—	.190*	.774*	.673*	.049*	.074*
2. Ratio of long term debt to long term debt and fund balance		—	-.007	-.051*	-.006	.115*
3. Total annual revenue			—	.749*	.067*	.075*
4. Endowment value at year-end				—	.043*	.059*
5. Estimated replacement value of buildings and equipment					—	-.019
6. Year						—
M	$6,088.3	.150	$18,224.4	$29,731.7	$53,060.3	4.533
SD	$8,809.7	.168	$14,596.3	$58,717.6	$578,231.2	2.278
n	3,625	3,625	3,625	3,553	3,613	3,625

Note. Dollar amounts are in thousands.
*p < .05.

Table B2
Intercorrelations Between Variables for Private Comprehensive Colleges and Universities

Variable	1	2	3	4	5	6
1. Long term debt amount at year-end	—	.454*	.802*	.496*	.042	.078*
2. Ratio of long term debt to long term debt and fund balance		—	.223*	-.021	.003	.140*
3. Total annual revenue			—	.555*	.063*	.099*
4. Endowment value at year-end				—	.019	.073*
5. Estimated replacement value of buildings and equipment					—	-.037
6. Year						—
M	$11,531.1	.187	$30,501.7	$20,045.1	$158,560.7	4.530
SD	$14,680.8	.136	$25,672.7	$36,985.1	$2,933,857.1	2.271
n	1,769	1,769	1,769	1,751	1,768	1,769

Note. Dollar amounts are in thousands.
*p < .05.

Table B3
Intercorrelations Between Variables for Private Doctoral Universities

Variable	1	2	3	4	5	6
1. Long term debt amount at year-end	--	.165*	.812*	.555*	.008	.058
2. Ratio of long term debt to long term debt and fund balance		--	-.047	-.132*	.042	.072
3. Total annual revenue			--	.558*	.013	.074
4. Endowment value at year-end				--	.001	.097
5. Estimated replacement value of buildings and equipment					--	.066
6. Year						--
M	$45,375.8	.222	$110,689.0	$100,876.0	$352,059.7	4.447
SD	$49,156.1	.175	$86,305.0	$143,782.4	$3,364,221.7	2.265
n	338	338	338	337	338	338

Note. Dollar amounts are in thousands.
*p < .05.

Table B4
Intercorrelations Between Variables for Private Research Universities

Variable	1	2	3	4	5	6
1. Long term debt amount at year-end	--	.332*	.687*	.687*	.391*	.067
2. Ratio of long term debt to long term debt and fund balance		--	.096	-.180*	-.152*	.224*
3. Total annual revenue			--	.476*	.393*	.110
4. Endowment value at year-end				--	.547*	.091
5. Estimated replacement value of buildings and equipment					--	.070
6. Year						--
M	$207,305.8	.182	$585,711.1	$810,530.6	$855,239.9	4.517
SD	$169,086.7	.099	$347,741.0	$964,848.0	$953,843.2	2.253
n	290	290	290	290	288	290

Note. Dollar amounts are in thousands.
*p < .05.

Table B5
Intercorrelations Between Variables for Public Baccalaureate Colleges

Variable	1	2	3	4	5	6
1. Long term debt amount at year-end	--	.750*	.516*	.261*	.120*	.118*
2. Ratio of long term debt to long term debt and fund balance		--	.130*	.066	-.083	.118*
3. Total annual revenue			--	.270*	.249*	.091
4. Endowment value at year-end				--	.220*	.238*
5. Estimated replacement value of buildings and equipment					--	-.064
6. Year						--
M	$4,095.1	.109	$19,916.5	$1,275.0	$41,951.8	4.579
SD	$5,137.6	.099	$8,946.5	$2,003.9	$35,165.1	2.274
n	430	430	430	305	430	430

Note. Dollar amounts are in thousands.
*p < .05.

Table B6
Intercorrelations Between Variables for Public Comprehensive Colleges and Universities

Variable	1	2	3	4	5	6
1. Long term debt amount at year-end	--	.613*	.508*	.236*	.365*	.101*
2. Ratio of long term debt to long term debt and fund balance		--	.021	-.006	.065*	.074*
3. Total annual revenue			--	.287*	.334*	.055*
4. Endowment value at year-end				--	.195*	.135*
5. Estimated replacement value of buildings and equipment					--	.009
6. Year						--
M	$13,024.7	.136	$58,071.6	$3,288.3	$103,457.7	4.532
SD	$14,280.1	.108	$38,978.2	$9,379.3	$95,700.8	2.283
n	1,578	1,578	1,578	1,187	1,576	1,578

Note. Dollar amounts are in thousands.
*p < .05.

Table B7
Intercorrelations Between Variables for Public Doctoral Universities

Variable	1	2	3	4	5	6
1. Long term debt amount at year-end	--	.679*	.795*	.424*	.101*	.048
2. Ratio of long term debt to long term debt and fund balance		--	.304*	.105*	.067	.090
3. Total annual revenue			--	.394*	.107*	.063
4. Endowment value at year-end				--	.027	.153*
5. Estimated replacement value of buildings and equipment					--	.044
6. Year						--
M	$29,544.9	.126	$129,043.6	$12,850.9	$273,994.0	4.496
SD	$31,630.1	.079	$79,518.5	$24,701.2	$761,594.5	2.290
n	442	442	442	402	442	442

Note. Dollar amounts are in thousands.
*p < .05.

Table B8
Intercorrelations Between Variables for Public Research Universities

Variable	1	2	3	4	5	6
1. Long term debt amount at year-end	--	.695*	.610*	.754*	.473*	.017
2. Ratio of long term debt to long term debt and fund balance		--	.284*	.284*	.250*	.003
3. Total annual revenue			--	.348*	.667*	.049
4. Endowment value at year-end				--	.322*	.076
5. Estimated replacement value of buildings and equipment					--	.036
6. Year						--
M	$111,401.3	.124	$451,455.8	$132,737.6	$779,563.5	4.480
SD	$133,546.9	.079	$290,363.0	$367,853.6	$583,702.1	2.283
n	538	538	538	514	537	538

Note. Dollar amounts are in thousands.
*p < .05.

Appendix C

Regression Analysis Summary Tables

Table C1
Summary of Simultaneous Regression Analysis for Variables Predicting Long Term Debt for Private Baccalaureate Colleges (n = 3,543)

Variable	B	SE B	β	t
Year	59,103.5748	40,716.3042	.0151	1.452
Total annual revenue	0.3735	0.0095	.6163	39.288*
Endowment value at year-end	0.0317	0.0024	.4391	13.414*
Estimated replacement value of buildings and equipment	-2.3065E-5	1.5822E-4	-.0015	-0.146

Note. $R^2 = .6195$; adjusted $R^2 = .6191$; $F(4, 3538) = 1{,}440.02$ ($p < .05$).
*$p < .05$.

Table C2
Tests of Regression Assumptions on Variables Predicting Long Term Debt for Private Baccalaureate Colleges

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9938	1.006
Total annual revenue	.4371	2.288
Endowment value at year-end	.4391	2.277
Estimated replacement value of buildings and Equipment	.9948	1.005

	1	2	3	4	5
Condition index	1.000	1.762	2.052	4.636	6.002

II. Independence of residual values.

Durbin-Watson test statistic: 1.9558

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
	X

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 83

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .001129
Number of cases with centered leverage value exceeding two times the mean value: 217

Table C3
Summary of Simultaneous Regression Analysis for Variables Predicting Long Term Debt for Private Comprehensive Colleges and Universities (n = 1,750)

Variable	B	SE B	β	t
Year	-14,617.9644	93,184.7811	-.0022	-0.157
Total annual revenue	0.4349	0.0099	.7600	44.149*
Endowment value at year-end	0.0298	0.0068	.0749	4.365*
Estimated replacement value of buildings and equipment	-3.7718E-5	7.1397E-5	-.0076	-0.528

Note. $R^2 = .6453$; adjusted $R^2 = .6445$; $F(4, 1745) = 793.77$ ($p < .05$).
*$p < .05$.

Table C4
Tests of Regression Assumptions on Variables Predicting Long Term Debt for Private Comprehensive Colleges and Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9886	1.012
Total annual revenue	.6859	1.458
Endowment value at year-end	.6911	1.447
Estimated replacement value of buildings and equipment	.9939	1.006

	1	2	3	4	5
Condition index	1.000	1.741	2.123	3.729	5.533

II. Independence of residual values.

Durbin-Watson test statistic: 2.1698

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 36

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .002286
Number of cases with centered leverage value exceeding two times the mean value: 83

Table C5
Summary of Simultaneous Regression Analysis for Variables Predicting Long Term Debt for Private Doctoral Universities (n = 337)

Variable	B	SE B	β	t
Year	-215,610.8414	687,116.1103	-.0099	-0.314
Total annual revenue	0.4158	0.0215	.7293	19.296*
Endowment value at year-end	0.0508	0.0130	.1485	3.920*
Estimated replacement value of buildings and equipment	-2.2052E-5	4.5892E-4	-.0015	-0.048

Note. $R^2 = .6736$; adjusted $R^2 = .6696$; $F(4, 332) = 171.26$ ($p < .05$).
*$p < .05$.

Table C6
Tests of Regression Assumptions on Variables Predicting Long Term Debt for Private Doctoral Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9860	1.014
Total annual revenue	.6883	1.453
Endowment value at year-end	.6852	1.459
Estimated replacement value of buildings and equipment	.9954	1.005

	1	2	3	4	5
Condition index	1.000	1.790	2.393	3.903	5.705

II. Independence of residual values.

Durbin-Watson test statistic: 1.8826

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 7

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .011869
Number of cases with centered leverage value exceeding two times the mean value: 24

Table C7
Summary of Simultaneous Regression Analysis for Variables Predicting Long Term Debt for Private Research Universities (n = 288)

Variable	B	SE B	β	t
Year	-1,222,198.2180	2,695,655.0630	-.0168	-0.453
Total annual revenue	0.2342	0.0199	.4969	11.751*
Endowment value at year-end	0.0815	0.0083	.4569	9.830*
Estimated replacement value of buildings and equipment	-0.0092	0.0076	-.0534	-1.204

Note. $R^2 = .6222$; adjusted $R^2 = .6168$; $F(4, 283) = 116.50$ ($p < .05$).
*$p < .05$.

Table C8
Tests of Regression Assumptions on Variables Predicting Long Term Debt for Private Research Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9775	1.023
Total annual revenue	.7467	1.339
Endowment value at year-end	.6178	1.619
Estimated replacement value of buildings and equipment	.6775	1.476

	1	2	3	4	5
Condition index	1.000	2.703	3.901	4.758	6.691

II. Independence of residual values.

Durbin-Watson test statistic: 1.9798

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 1

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .013888
Number of cases with centered leverage value exceeding two times the mean value: 20

Table C9
Summary of Simultaneous Regression Analysis for Variables Predicting Long Term Debt for Public Baccalaureate Colleges (n = 305)

Variable	B	SE B	β	t
Year	136,792.1885	80,041.7219	.0914	1.709
Total annual revenue	0.1637	0.0229	.3868	7.136*
Endowment value at year-end	0.2647	0.0962	.1523	2.752*
Estimated replacement value of buildings and equipment	-0.0076	0.0052	-.0784	-1.456

Note. $R^2 = .2183$; adjusted $R^2 = .2079$; $F(4, 300) = 20.94$ ($p < .05$).
*$p < .05$.

Table C10
Tests of Regression Assumptions on Variables Predicting Long Term Debt for Public Baccalaureate Colleges

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9112	1.097
Total annual revenue	.8869	1.127
Endowment value at year-end	.8505	1.176
Estimated replacement value of buildings and equipment	.8971	1.115

	1	2	3	4	5
Condition index	1.000	2.592	3.223	5.330	7.734

II. Independence of residual values.

Durbin-Watson test statistic: 2.3319

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 5

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .013115
Number of cases with centered leverage value exceeding two times the mean value: 19

Table C11
Summary of Simultaneous Regression Analysis for Variables Predicting Long Term Debt for Public Comprehensive Colleges and Universities (n = 1,187)

Variable	B	SE B	β	t
Year	407,052.9920	150,697.0543	.0653	2.701*
Total annual revenue	0.1446	0.0099	.3881	14.582*
Endowment value at year-end	0.0995	0.0381	.0660	2.611*
Estimated replacement value of buildings and equipment	0.0363	0.0037	.2532	9.745*

Note. $R^2 = .3238$; adjusted $R^2 = .3215$; $F(4, 1182) = 141.48$ ($p < .05$).
*$p < .05$.

Table C12
Tests of Regression Assumptions on Variables Predicting Long Term Debt for Public Comprehensive Colleges and Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9788	1.022
Total annual revenue	.8078	1.238
Endowment value at year-end	.8952	1.117
Estimated replacement value of buildings and equipment	.8477	1.180

	1	2	3	4	5
Condition index	1.000	2.114	3.174	4.247	6.468

II. Independence of residual values.

Durbin-Watson test statistic: 1.5863

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 20

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .003370
Number of cases with centered leverage value exceeding two times the mean value: 108

Table C13
Summary of Simultaneous Regression Analysis for Variables Predicting Long Term Debt for Public Doctoral Universities (n = 402)

Variable	B	SE B	β	t
Year	-319,080.6296	421,665.4777	-.0226	-0.757
Total annual revenue	0.2976	0.0128	.7492	23.263*
Endowment value at year-end	0.1732	0.0426	.1317	4.070*
Estimated replacement value of buildings and equipment	5.0701E-4	0.0012	.0124	0.417

Note. $R^2 = .6562$; adjusted $R^2 = .6528$; $F(4, 397) = 189.46$ ($p < .05$).
*$p < .05$.

Table C14
Tests of Regression Assumptions on Variables Predicting Long Term Debt for Public Doctoral Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9749	1.026
Total annual revenue	.8350	1.198
Endowment value at year-end	.8272	1.209
Estimated replacement value of buildings and equipment	.9862	1.014

	1	2	3	4	5
Condition index	1.000	1.938	2.249	3.856	6.114

II. Independence of residual values.

Durbin-Watson test statistic: 2.0464

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 4

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .009950
Number of cases with centered leverage value exceeding two times the mean value: 25

Table C15
Summary of Simultaneous Regression Analysis for Variables Predicting Long Term Debt for Public Research Universities (n = 513)

Variable	B	SE B	β	t
Year	-3,013,533.4790	1,435,414.1340	-.0508	-2.099*
Total annual revenue	0.1755	0.0152	.3822	11.562*
Endowment value at year-end	0.2286	0.0096	.6199	23.840*
Estimated replacement value of buildings and equipment	0.0033	0.0076	.0144	0.441

Note. $R^2 = .7044$; adjusted $R^2 = .7021$; $F(4, 508) = 302.68$ ($p < .05$).
*$p < .05$.

Table C16
Tests of Regression Assumptions on Variables Predicting Long Term Debt for Public Research Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9930	1.007
Total annual revenue	.5325	1.878
Endowment value at year-end	.8606	1.162
Estimated replacement value of buildings and equipment	.5429	1.842

	1	2	3	4	5
Condition index	1.000	2.157	3.405	5.888	6.422

II. Independence of residual values.

Durbin-Watson test statistic: 1.2557

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
	X

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 11

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .007797
Number of cases with centered leverage value exceeding two times the mean value: 36

Table C17
Summary of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Private Baccalaureate Colleges (n = 3,543)

Variable	B	SE B	β	t
Year	0.0082	0.0012	.1146	6.862*
Total annual revenue	1.1057E-9	2.7943E-10	.0996	3.957*
Endowment value at year-end	-3.5371E-10	6.9532E-11	-.1277	-5.087*
Estimated replacement value of buildings and equipment	-1.0404E-12	4.6507E-12	-.0037	-0.224

Note. $R^2 = .0203$; adjusted $R^2 = .0192$; $F(4, 3538) = 18.30$ ($p < .05$).
*$p < .05$.

Table C18
Tests of Regression Assumptions on Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Private Baccalaureate Colleges

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9938	1.006
Total annual revenue	.4371	2.288
Endowment value at year-end	.4391	2.277
Estimated replacement value of buildings and Equipment	.9948	1.005

	1	2	3	4	5
Condition index	1.000	1.762	2.052	4.636	6.002

II. Independence of residual values.

Durbin-Watson test statistic: 1.8470

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
	X

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 18

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .001129
Number of cases with centered leverage value exceeding two times the mean value: 217

Table C19
Summary of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Private Comprehensive Colleges and Universities (n = 1,750)

Variable	B	SE B	β	t
Year	0.0073	0.0014	.1222	5.344*
Total annual revenue	1.7648E-9	1.7648E-10	.3373	12.287*
Endowment value at year-end	-7.8502E-10	9.9526E-11	-.2157	-7.888*
Estimated replacement value of buildings and equipment	-4.2671E-13	1.0411E-12	-.0093	-0.410

Note. $R^2 = .0982$; adjusted $R^2 = .0962$; $F(4, 1745) = 47.52$ ($p < .05$).
*$p < .05$.

Table C20
Tests of Regression Assumptions on Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Private Comprehensive Colleges and Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9886	1.012
Total annual revenue	.6859	1.458
Endowment value at year-end	.6911	1.447
Estimated replacement value of buildings and equipment	.9939	1.006

	1	2	3	4	5
Condition index	1.000	1.741	2.123	3.729	5.533

II. Independence of residual values.

Durbin-Watson test statistic: 1.9841

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 12

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .002286
Number of cases with centered leverage value exceeding two times the mean value: 83

Table C21
Summary of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Private Doctoral Universities (n = 337)

Variable	B	SE B	β	t
Year	0.0071	0.0042	.0917	1.684
Total annual revenue	8.9037E-11	1.3133E-10	.0442	0.678
Endowment value at year-end	-2.0021E-10	7.8999E-11	-.1656	-2.534*
Estimated replacement value of buildings and equipment	1.8659E-12	2.7972E-12	.0362	0.667

Note. $R^2 = .0290$; adjusted $R^2 = .0173$; $F(4, 332) = 2.48$ ($p < .05$).
*$p < .05$.

Table C22
Tests of Regression Assumptions on Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Private Doctoral Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9860	1.014
Total annual revenue	.6883	1.453
Endowment value at year-end	.6853	1.459
Estimated replacement value of buildings and equipment	.9954	1.005

	1	2	3	4	5
Condition index	1.000	1.790	2.393	3.903	5.705

II. Independence of residual values.

Durbin-Watson test statistic: 1.9863

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
	X

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 2

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .011869
Number of cases with centered leverage value exceeding two times the mean value: 24

Table C23
Summary of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Private Research Universities (n = 288)

Variable	B	SE B	β	t
Year	0.0102	0.0025	.2327	4.168*
Total annual revenue	6.8326E-11	1.8172E-11	.2402	3.760*
Endowment value at year-end	-2.6720E-11	7.5550E-12	-.2484	-3.537*
Estimated replacement value of buildings and equipment	-1.3189E-11	6.9507E-12	-.1272	-1.897

Note. $R^2 = .1378$; adjusted $R^2 = .1256$; $F(4, 283) = 11.30$ ($p < .05$).
*$p < .05$.

Table C24
Tests of Regression Assumptions on Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Private Research Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9775	1.023
Total annual revenue	.7467	1.339
Endowment value at year-end	.6178	1.619
Estimated replacement value of buildings and equipment	.6775	1.476

	1	2	3	4	5
Condition index	1.000	2.703	3.901	4.758	6.691

II. Independence of residual values.

Durbin-Watson test statistic: 1.8505

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 4

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .013888
Number of cases with centered leverage value exceeding two times the mean value: 20

Table C25
Summary of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Public Baccalaureate Colleges (n = 305)

Variable	B	SE B	β	t
Year	0.0039	0.0021	.1111	1.870
Total annual revenue	7.0975E-10	6.0225E-10	.0710	1.178
Endowment value at year-end	1.8877E-9	2.5255E-9	.0460	0.747
Estimated replacement value of buildings and equipment	-2.6681E-10	1.3771E-10	-.1160	-1.938

Note. $R^2 = .0356$; adjusted $R^2 = .0227$; $F(4, 300) = 2.77$ ($p < .05$).

Table C26
Tests of Regression Assumptions on Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Public Baccalaureate Colleges

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9112	1.097
Total annual revenue	.8869	1.127
Endowment value at year-end	.8505	1.176
Estimated replacement value of buildings and equipment	.8971	1.115

	1	2	3	4	5
Condition index	1.000	2.592	3.223	5.330	7.734

II. Independence of residual values.

Durbin-Watson test statistic: 2.3438

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 5

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .013115
Number of cases with centered leverage value exceeding two times the mean value: 19

Table C27
Summary of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Public Comprehensive Colleges and Universities (n = 1,187)

Variable	B	SE B	β	t
Year	0.0047	0.0013	0.1053	3.622*
Total annual revenue	1.4970E-12	8.4830E-11	5.6500E-4	0.018
Endowment value at year-end	-4.3625E-10	3.2600E-10	-0.0407	-1.338
Estimated replacement value of buildings and equipment	1.0827E-10	3.1884E-11	0.1061	3.396*

Note. $R^2 = .0213$; adjusted $R^2 = .0179$; $F(4, 1182) = 6.42$ ($p < .05$).
*$p < .05$.

Table C28
Tests of Regression Assumptions on Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Public Comprehensive Colleges and Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9788	1.022
Total annual revenue	.8078	1.238
Endowment value at year-end	.8952	1.117
Estimated replacement value of buildings and equipment	.8477	1.180

	1	2	3	4	5
Condition index	1.000	2.114	3.174	4.247	6.468

II. Independence of residual values.

Durbin-Watson test statistic: 1.3572

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 21

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .003370
Number of cases with centered leverage value exceeding two times the mean value: 108

Table C29
Summary of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Public Doctoral Universities (n = 402)

Variable	B	SE B	β	t
Year	0.0022	0.0017	.0636	1.314
Total annual revenue	2.8842E-10	5.0720E-11	.2975	5.686*
Endowment value at year-end	-7.3434E-11	1.6878E-10	-.0229	-0.435
Estimated replacement value of buildings and equipment	3.3367E-12	4.8191E-12	.0333	0.692

Note. $R^2 = .0929$; adjusted $R^2 = .0837$; $F(4, 397) = 10.16$ ($p < .05$).
*$p < .05$.

Table C30
Tests of Regression Assumptions on Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Public Doctoral Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9749	1.026
Total annual revenue	.8350	1.198
Endowment value at year-end	.8272	1.209
Estimated replacement value of buildings and equipment	.9862	1.014

	1	2	3	4	5
Condition index	1.000	1.938	2.249	3.856	6.114

II. Independence of residual values.

Durbin-Watson test statistic: 2.0232

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 3

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .009950
Number of cases with centered leverage value exceeding two times the mean value: 25

Table C31
Summary of Simultaneous Regression Analysis for Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Public Research Universities (n = 513)

Variable	B	SE B	β	t
Year	-6.4848E-4	0.0014	-.0194	-0.468
Total annual revenue	5.1179E-11	1.4658E-11	.1976	3.492*
Endowment value at year-end	4.6289E-11	9.2576E-12	.2226	5.000*
Estimated replacement value of buildings and equipment	4.4851E-12	7.3297E-12	.0343	0.612

Note. $R^2 = .1337$; adjusted $R^2 = .1269$; $F(4, 508) = 19.60$ ($p < .05$).
*$p < .05$.

Table C32
Tests of Regression Assumptions on Variables Predicting the Ratio of Long Term Debt to Long Term Debt and Fund Balance for Public Research Universities

I. Collinearity.

Variable	Tolerance	Variance Inflation Factor
Year	.9930	1.007
Total annual revenue	.5325	1.878
Endowment value at year-end	.8606	1.162
Estimated replacement value of buildings and equipment	.5429	1.842

	1	2	3	4	5
Condition index	1.000	2.157	3.405	5.888	6.422

II. Independence of residual values.

Durbin-Watson test statistic: 1.2766

III. Normality of distribution of residual values.

Plot of residual values in relation to a normal distribution probability plot:

Similar	Not Similar
X	

IV. Presence of outliers and their influence.

Casewise plot of standardized residual values.
Number of cases with standardized residual value greater than –3 or +3: 7

Comparison of case centered leverage values to the mean of all case centered leverage values.
Mean centered leverage value: .007797
Number of cases with centered leverage value exceeding two times the mean value: 36

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Vita

James Alan Shultz

Birth date: **September 22, 1947**

Birth place: **Punxsutawney, Pennsylvania**

Education:

1992-1995	The College of William and Mary Williamsburg, Virginia Educational Specialist Degree
1978-1982	Virginia Commonwealth University Richmond, Virginia Master of Business Administration
1969-1970	The University of Michigan Ann Arbor, Michigan Master of Arts
1965-1969	Clarion University of Pennsylvania Clarion, Pennsylvania Bachelor of Arts