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FINANCIAL CONDITION AND TUITION

IN PRIVATE NONPROFIT BACCALAUREATE HIGHER EDUCATION

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ABSTRACT

The rate of tuition inflation at U.S. colleges and universities is alarming and threatens both access and choice. Private nonprofit baccalaureate colleges often possess the highest tuition rates but routinely face financial challenges. This study was designed to better understand the relationship between tuition and financial condition for the private nonprofit baccalaureate sector of U.S. higher education. Using panel data from 452 colleges from 1998 to 2008, the model indicated a relatively weak overall association between tuition and five elements of financial condition; operating results, liquidity and flexibility, leverage, asset performance, and tuition discount. In spite of the weak overall association, liquidity and flexibility, leverage, and asset performance each possess statistically significant relationships with the annual percentage change in tuition.

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Chapter 1

Introduction

The high rate of tuition inflation and reduced affordability threaten the equity of access and choice in higher education (Heller, 1997; McPherson and Schapiro, 1998; Paulsen, 2001). From 1984 to 2008, college tuition and fees increased 439 percent compared to 251 percent increase in medical costs and a 147 percent increase in median family income (National Center for Public Policy and Higher Education, 2008). Although they are one of the most expensive options in higher education, private nonprofit baccalaureate colleges are an important segment of the higher education market and may be the best options for many undergraduate students. These often small colleges stand at a competitive disadvantage with both state-funded public universities and larger private colleges and often come under intense criticism for high tuition rates. Despite broad public perception of private colleges as wealthy, many face poor financial circumstances. Lacking public support, private colleges are heavily dependent on tuition making them more vulnerable to demographic shifts in population and changes in the overall economy. This dissertation attempts to investigate the relationship between the annual percentage change in tuition and financial condition at private, non-profit, baccalaureate higher education institutions.

Higher education in the U.S. is diverse and includes large public and private research universities, land-grant universities, regional comprehensive institutions, community colleges and for-profit universities located in urban, suburban, and rural locations. Small learning-centered private baccalaureate colleges are an alternative favored by many prospective undergraduate students. Compared to research universities and regional institutions, small private colleges "evidenced stronger positive impacts on a broad range of empirically vetted good practices in undergraduate education" (Pascarella, Wolniak, Cruce, and Blaich, 2004, p. 57). These good

practices include: student-faculty contact; faculty interest in student development; peer cooperation; academic effort/involvement; and faculty instructional skill, organization, and preparation (Pascarella et al., 2004). Students at small private baccalaureate colleges are also more likely than their peers at larger public universities to interact with faculty, get involved in campus government and honors programs, participate in athletics, participate verbally in class, and find their classroom instruction more satisfying (Astin, 1977). Additionally, a high proportion of graduates from small private baccalaureate colleges earn PhDs (Breneman, 1994) and these same colleges have better degree completion rates than public universities (National Association of Independent Colleges and Universities, 2006; Porter, 1990).

Small private colleges are often viewed as catering to only the wealthy but they are committed to access. Private colleges and universities enroll a greater proportion of low-income students and a lower proportion of higher income students than do large public research (doctoral) universities (Berkner, Wei, He, Lew, Cominole, and Siegel, 2005). The median family income of students' families in state universities and private colleges is identical (Breneman, 1994).

Despite their many benefits, private colleges are not without problems as they face both considerable financial challenges and fierce competition with one another and competitors from other sectors of higher education. The overwhelming majority of private baccalaureate colleges have enrollment under 3000 students. Compared to their larger private counterparts, these small colleges are at greater risk of closing, more likely to be have tuition dependency greater than 60 percent, more likely to experience enrollment volatility, and more likely to report operating deficits (Townsley, 2002). To continue to operate, small private colleges with already high tuition have routinely increased tuition by three percent more than the rate of consumer inflation (Toutkoushian, 2001; College Board, 2006). Private colleges, with large tuition, are often viewed as the least affordable option for many prospective students. For instance, academic year 2011-12

tuition and fees at private nonprofit four-year colleges was $28,500 compared to $8.244 at public universities (College Board, 2011).

Many students, parents, and legislators often assume private colleges are wealthier than their public counterparts and question the astronomical growth of both tuition and expenditures. These critics levy accusations of inefficiency, waste, and greed and ask why colleges and universities cannot "behave more like business firms and hold down their costs?" (Ehrenberg, 2002, p.5). Despite collecting an "avalanche of data about every facet of the institution" (Geiger, 2004, p. 242), these institutions are accused of ignoring relevant financial information in setting tuition (Yanikoski, 1989). According to one estimate, only 15 percent of college governing boards use long-term strategic financial planning and only 35 percent have minimal knowledge of fiscal planning (Thomas C. Longin at the Association of Governing Boards and Universities 2009 annual meeting in Fain 2009). Setting tuition is arguably the most important financial decision for private colleges where net tuition revenue is often the largest source of total revenue. This study seeks to develop a better understanding of the relationship between financial condition and the annual percentage change in tuition at private baccalaureate colleges.

The results will be important for higher education leaders, students, policy makers, and academic researchers. The financial condition of private baccalaureate colleges has been seriously questioned since the end of WWII when regional comprehensive state universities began to dominate enrollment. Several studies found small private baccalaureate colleges to be endangered and predicted their demise (Cheit, 1971; Jellema, 1973; Chaffee, 1984; and Breneman, 1994). In spite of the enrollment decreases after the graduation of the baby boom generation, the high inflation of the 1970s, economic weakness in the early 1980s and 1990s, and public criticism over steep increases in tuition, private baccalaureate colleges have persevered. These heavily tuition-dependent institutions have survived, in part, by employing a strategy of rapidly increasing gross tuition while offering more institutional aid to attract the brightest

students. This strategy is designed to enhance the prestige of the institution and subsequently increase net tuition (Bowen, 1980; Hoxby, 1997; Winston, 2000; Geiger, 2004). Although often successful in terms of institutional survival, high tuition increases have attracted negative public attention and may deter potential students from applying. Ehrenberg (2000) predicted an eventual limit to tuition increases at private colleges resulting in the need for cost-cutting and downsizing to survive. Small private baccalaureate colleges are routinely identified as "institutions facing challenges" by Moody's Investor Service (2007) while large research and comprehensive universities and most community colleges are rated as "stable" or "institutions with positive momentum."

Competition within the private baccalaureate sector leads to higher spending on financial aid, new programs, and amenities to attract the best students. Ultimately, the high spending strategy, known as the *field of dreams* mentality (Townsley, 2002) or the *positional arms race* (Winston, 2000), makes all but the most elite institutions in the sector weaker and makes the entire sector look worse compared to other higher education sectors. This strategy complicates the issue of access because high gross tuition scares off many students.

Research Questions

An institution's assessment of its short-term and long-term overall financial condition ought to be a critical factor in setting tuition. Prior research on financial condition and tuition generally used a short-term time horizon and focused almost exclusively on annual operating measures. This study will examine the effect of different elements of financial condition on the annual percentage change in tuition at 452 private, nonprofit, baccalaureate U.S. colleges from 1998 through 2007. The Integrated Postsecondary Education Data System (IPEDS), an annual

survey of data from colleges and universities administered by the U.S. Department of Education, is the source of the data.

Primary Research Question:

1. Is financial condition associated with the annual percentage change in tuition at private nonprofit baccalaureate colleges?

Secondary Research Questions:

2. Are annual *operating results* associated with the annual percentage change in tuition?
3. Are *liquidity* and *flexibility* associated with the annual percentage change in tuition?
4. Is *leverage* associated with the annual percentage change in tuition?
5. Is *asset performance* associated with the annual percentage change in tuition?
6. Is the *tuition discount* associated with the annual percentage change in tuition?

To explore the relationship between financial condition and tuition, this study will use ratio analysis incorporating information from colleges' annual financial statements. The ratio analysis concept is borrowed from the for-profit community and is facilitated by changes in accounting and financial reporting for private colleges in the late 1990s.

Understanding financial condition is made possible by the use of annual financial statements. The financial statements are a summary of past economic events and are designed to communicate information to interested parties. For private colleges, the financial statements include the Statements of Activities, Financial Position, and Cash Flows and include supplementary notes. The Statement of Activities summarizes annual operating performance measures such as revenues and expenditures categorized by source and type. Resources such as

capital assets, financial assets and debt are reported on the Statement of Financial Position. Changes in cash summarized by operating, investing or financing activities are found on the Statement of Cash Flows. The financial data allow various stakeholders to make informed decisions in shaping strategy and allocating resources. This information is a measure of past performance, a predictor of future performance, an indicator of the impact of environmental changes, and a measure of management's success. Much of the data found in institutional financial statements is reported to IPEDS.

Ratio analysis facilitates comparisons between institutions and adjusts for differences over time. Long used by for-profit organizations, ratio analysis is a way to effectively communicate and understand large amounts of financial and non-financial information. Financial analysts, lenders, bond rating organizations, government agencies, and higher education accrediting organizations often use ratios. A financial ratio is the relationship between two numbers found in the organization's financial statements. The ratio provides a "better understanding of financial condition and institutional priorities than either of these data standing alone" (Chabotar, 1989, p. 188). Common financial ratios used in higher education include the tuition discount (institutional aid divided by gross tuition revenue) and tuition dependency (net tuition revenue divided by total revenues).

The use of a full range of ratio analyses, similar to that used by for-profit organizations, is now possible due to a change from the fund accounting concept to the net asset concept of accounting and financial reporting for private nonprofits, including colleges and universities. For the fiscal year ended June 30, 1996 and after, the Financial Accounting Standards Board (1993) Statement of Financial Accounting Standards (SFAS) number 117 required a new financial statement presentation resembling that of for-profit entities. Under SFAS 117, financial statements reported a single comprehensive operating measure called the *change in net assets* (similar to net income or net profit) that accounts for operating, investing and financing activities.

This net asset approach to financial reporting allows readers to determine if, and by how much, the institution is better off at the end of the year than it was at the beginning of the year. Fund accounting was based on the stewardship concept of reporting by fund group, or donor purpose; unrestricted, temporarily restricted, permanently restricted, agency, plant, and debt. The financial statements under fund accounting were confusing because transfers and loan obligations between funds made it impossible to determine an institution's overall financial condition. One critic called fund accounting "downright dangerous" (Winston, 1994, p. 71).

Two additional accounting standards help determine the time frame for this study (1998-2008). SFAS 116, effective for fiscal year ended June 30, 1996, required private colleges to record pledges of future donations as income and receivables. SFAS 124, effective for fiscal year ended June, 30, 1997, required the reporting of unrealized gains or losses on investments. As a result of these accounting changes, this study uses data from fiscal years ended 1998 through 2008. For a clear picture of financial condition, many analysts recommend at least a five-year time horizon (Prager, Sealy & Co., KPMG, & Bearing Point, 2005).

To appropriately apply ratio analysis to higher education, one must understand the unique features of pricing and costs in higher education. First, colleges differ from for-profit enterprises in that sales do not completely cover the cost of providing service. Subsidies are available in the form of gifts, grants, endowments and investments. Paulsen (2001, p.15) offers the following equation; tuition "equals cost minus subsidy." This equation indicates a traditional nonprofit philosophy with a minimum tuition rate covering all costs less non-tuition revenues with no included profit. However, this does not suggest that colleges seek to minimize their revenues and contain costs. According to Howard Bowen's (1980, p. 20) revenue theory of costs, "each institution raises all the money it can… and spends all it raises." Despite Bowen's theory and a nonprofit philosophy of pricing, rarely do revenues equal expenditures in higher education. Surpluses and deficits may be the result of careful organizational planning, unforeseen economic

events, or mere chance. For instance, colleges could plan for a surplus to recover past operating deficits, expand future operations, or prepare for projected operating deficits. On the other hand, colleges may intentionally minimize a surplus to avoid criticism from policy makers, students and other critics. If one assumes intentional effort on the part of college administrators to minimize the surplus and a larger-than-expected surplus or deficit actually results, an unexpected event has occurred and financial condition has changed.

Second, the nature of costs at colleges differs from that of for-profit organizations in that many costs in higher education are committed or fixed and cost savings are limited because of productivity lag. Like most corporations, colleges have both fixed and variable costs and techniques are available to separate them (Allen & Brinkman, 1983; Toutkoushian, 1999; and Harter, Wade & Watkins, 2005). Despite the availability of these cost techniques, colleges and universities do not use cost analysis in tuition decisions and little is known about colleges' use of sophisticated cost analysis procedures (Yanikoski, 1989). One practical reason for this lack of cost analysis in higher education is the fact that many higher education costs are fixed. Salaries for tenured faculty and debt payments remain are long-term commitments. Eliminating tenured faculty will likely result in legal, public relations, and future faculty recruitment challenges. Other faculty and administrative staffing costs are variable but commitments are made before enrollment is certain. It is difficult for colleges to make substantive short run adjustments to these cost commitments.

In spite of productivity improvements in other industries, cost reduction via gains in productivity is nearly impossible in higher education (despite developments in 'courseware' and distance learning). In labor-intensive fields like education, increases in salaries outpace any cost savings from improving productivity. This phenomenon is known as productivity lag or Baumol's cost disease (Baumol and Bowen, 1966). Technological innovations often result in

enhanced productivity in other industries. However, colleges and universities have not yet found a way to use technology to teach more students faster.

College administrators are quick to link tuition increases to rising costs but the intense pressure to compete for bright students is another explanation for rising costs. Rankings such as those published annually by *U.S. News and World Report* (*USN&WR*) favor institutions with large expenditures per student. Large student expenditures are generally made possible by high net tuition and/or a large endowment (Winston, 2000).

Importance of Research

Private nonprofit baccalaureate colleges are a vital part of U.S. higher education comprising over 20 percent of all four-year colleges in the U.S. (NCES). They offer a learning-centered alternative to larger, research universities. Low faculty-students ratios, liberal arts curricula, and faculty contact are favored by many students and are commonly found in private baccalaureate colleges. Despite numerous predictions of their demise, these colleges have proved resilient when confronting economic challenges and stiff competition from other colleges and universities. Research on financial condition and decision-making at these institutions can provide a better understanding to higher education critics, consumers, leaders, policy makers and institutional researchers. This understanding may help preserve the unique opportunities provided by private baccalaureate colleges among the diverse array of higher education offerings in the U.S.

Higher education administrators, stakeholders, and policymakers can make better decisions with an enhanced understanding of the link between tuition and financial condition. Paulsen (2001) best summarizes the importance of this line of research:

> *Ideally, through advances in theory development as well as the implementation of more comprehensive research designs, the emergence of a critical mass of new theoretical and empirical work will empower higher education scholars and policy-makers with both the understanding and resolve to reverse the trends of tuition inflation and reduced affordability and their destructive effects on the equity of access, choice, persistence, and attainment in higher education in the not-too-distant future* (p. 251).

Furthermore, these institutions, because of their small size and high tuition dependency, are forced to address market concerns and changes earlier than larger, more diversified, universities. In one way, they are like "canaries in a mine" in that they show the first signs of distress or success when market changes occur (Schuman, 2005, pg. 2). For this reason, an understanding of financial condition and decision-making in this sector may predict challenges and opportunities for other institutions of higher education. State support of public higher education has decreased with many state institutions receiving less than 20 percent of their budgets or less from the state. The University of Michigan at Ann Arbor receives only seven percent of its revenue from the state and some legislators in Michigan and Colorado have suggested privatizing flagship universities (Kelderman, 2009). Public universities are increasingly dependent on tuition and despite the concern for the privatization of public universities, some public institutions are finding operating flexibility in abandoning state support (Kelderman, 2009).

Chapter 2

Literature Review

Any study of the relationship between financial condition and tuition at private baccalaureate colleges requires an understanding of the history and economic behavior of these institutions. Frameworks for financial analysis derived from economic theory provide the necessary foundation for understanding institutional financial condition. Previous research on financial condition in higher education and tuition models informs the current study. Finally, a conceptual framework illustrating the decision-usefulness of accounting information underpins this study.

Historical Context

Private colleges and universities have always been in need of financial support but rarely more so than in the present era. Despite the financial challenges facing so many private colleges, they have proved resilient. Colonial colleges had a long history of survival and success that exceeds that of any major corporation and rivals that of some churches. American higher education was supported by religious organizations, tuition and community gifts during the colonial period. From the early to mid-1800s, tuition, college agents, local boosters, and state lotteries became additional revenue sources for private colleges. By the mid-1800s, increasing numbers of students and the American economy demanded more useful knowledge. The Morrill Act of 1862 saw the founding of land grant universities and marked a shift in public policy to support usable education. The late 19th and early 20th centuries saw new sources of support from alumni, state governments, and wealthy industrial families. The Morrill Act also set into motion

a trend toward large comprehensive universities which would come to serve the majority of undergraduate students over one-hundred years later.

Following the Civil War, there was considerable growth in higher education. Between 1870 and 1944, the number of colleges quintupled, and enrollments increased several thousand percent (Cohen, 1998). Land-grant universities blossomed, normal schools became teachers' colleges then state colleges, and junior colleges appeared for the first time. Despite the growing competition, small private baccalaureate colleges still enrolled two-thirds of college students at the start of the 20th century (Breneman, 1994). These institutions remained at the core of U.S. higher education until World War II.

Following War World II and the passage of the GI Bill, enrollments grew rapidly and the baby boomer generation added to high enrollments through the 1960s. Additionally, large philanthropic foundations, business firms and the federal government emerged as financing sources for higher education. Private colleges, long the leaders in higher education were now competing with land-grant universities and teachers' colleges for students and public aid. Competition for the best and brightest students was fierce. Private colleges did not fare well in this competitive environment. In 1950, private institutions enrolled roughly 50 percent of the nations' students. Twenty-five years later they enrolled under 25 percent (Bowen and Minter, 1975). From 1945-1975 "more than 600 public institutions were added, 500 of them two-year colleges" and "in the private sector, 650 new institutions were opened, but half as many closed" (Cohen, 1998, p. 187). In 1970 there were 719 small liberal arts colleges and by 1976 there were 583 (Schuman, 2005).

During the 1970s, the situation worsened as the number of high school graduates began to decline, state funding of state universities became a smaller portion of total operating revenues (a trend which has continued), and Federal policy changes directed funds to students and not to institutions. Budget cuts and increased fundraising efforts were necessary for the survival of private colleges bearing the burden of unsustainable growth, increased competition with less

expensive public universities, rising inflation, and increased energy costs. The outlook was bleak for many private colleges, as experts predicted them to close, merge, or alter missions (Bowen and Minter, 1975; Cheit, 1971; Jellema, 1973).

To survive falling enrollments, colleges and universities experienced a "managerial revolution" in which universities began to use more sophisticated managerial and financial analysis (Keller, 1983). Several universities insisted selected units should pay their own way and evaluated new units via a minimum rate of return. Financial and administrative services increased as regulatory and reporting requirements grew resulting in offices of grants and contracts, student financial aid, and business incubators.

Despite the persistence of many private colleges during the 1970s, the outlook for the 1980s was not much better. Robert Behn predicted "that as many as 200 small, tuition-dependent institutions would fail during the 1980s" (Breneman, 1994, p. 91). Such predictions proved incorrect. During the 1980s, a nationwide market emerged as colleges and universities began to spend more to enhance quality and increase prestige. As a result, tuition increased sharply. Institutions with large endowments were able to spend more than less wealthy competitors resulting in increased enrollment and tuition revenues. This increased spending on residence halls, athletic facilities, laboratories, and recreational spaces is what has been termed the "positional arms race" in higher education (Winston, 2000, p. 2). Lacking the funds to compete with more selective and wealthier universities, less selective colleges increased their offers of merit aid to entice the best and brightest students to enroll (McPherson and Schapiro, 1998). Other universities were forced to make competitive merit aid offers to compete in this new market for high quality students. To compensate for institutional merit aid, sticker price tuition increased at nearly twice the rate of inflation. Fortunately for many high tuition private colleges, the tuition increases did not scare off parents who associated price with quality.

Critics viewed the tuition increases as evidence of greed and misguided priorities. Administrators pointed to the increased costs of labor, materials, fuel, medical benefits and larger

numbers of faculty and staff as the main culprits for tuition increases. Despite increased productivity improvements in other industries, cost reduction via gains in productivity is nearly impossible in higher education due to the notion of productivity lag discussed previously (Baumol and Bowen, 1966). However, research examining the relationship of costs to tuition found most tuition increases to be largely unexplained (Clotfelter, 1996; Ehrenberg, 2002). The intense market competition for bright students and position in the prestige hierarchy is one explanation. Rankings such as those published annually by *U.S. News and World Report* (*USN&WR*) (2007) favor institutions with large expenditures per student.

Economic Theories of Higher Education

Critics often lament the fact that higher education institutions do not behave more like firms but nonprofit colleges and universities are subject to unique economic challenges. Educational values often clash with market forces, costs of production, and financial constraints (Massy, 2003). To explain the market behavior of colleges and universities, economists have applied theory to higher education to develop models that address the unique features of nonprofit higher education. These models are similar but distinct from Theory of the Firm. What follows is a brief discussion and summary of various economic theories of higher education.

Howard Bowen's (1980) Revenue Theory of Costs developed from his study of college costs from the late 1960s through 1970. His theory asserts that colleges and universities raise as much revenue as possible then subsequently spend all their revenues. Bowen's theory indicates several laws of college and university cost behavior:

1. The dominant goals are educational excellence, prestige, and influence.
2. There is virtually no limit to the amount of money an institution could spend to achieve these goals.
3. Each institution raises all it can.

4. Each institution spends all it raises.
5. The cumulative effect is toward ever-increasing expenditures.

Bowen's idea represents a circular logic. The pursuit of prestige requires spending. The new spending enhances prestige (i.e. improves ranking) and results in higher tuition that is spent to develop even more prestige as measured by higher rankings. This cyclic phenomenon describes a positional market and is also discussed by Winston (2000) and Geiger (2004). Bowen's Theory does not account for financial assets, physical assets, nor debt.

A more complete work on university economic behavior is Garvin's (1980) model. In Garvin's model, the profit motive is absent but utility is derived from economic and psychic elements. Trustees, administrators and faculty differ on their individual utility functions but institutional decisions, policies, and strategies are a result of goal convergence. The common element in the individual utility functions is prestige. Prestige enhances reputations and is the number one priority of both faculty and administrators. At the personal, departmental and institutional levels, "prestige is an essential feature of the social system of the… academic community" (Garvin, 1980, p. 23). Decision-making is biased towards the pursuit of prestige within constraints, colleges "weigh…considerations…of institutional prestige…heavily…in organizational decision making" (Garvin, 1980, p. 22). Prestige contributes to survival. Those activities that enhance the university's survival are most likely to be pursued. This idea is consistent with Resource Dependence Theory by which an organization seeks to maximize and stabilize the flows of revenue needed for survival (Slaughter and Leslie, 1997).

Garvin reviewed popular non-economic models of university behavior, including; collegial, bureaucratic, political, and organized anarchy. These models share three limitations; they lack consideration of market or external effects, their omission of details makes empirical testing impossible, and they do not explain the motivations of administration and faculty (Garvin, 1980). Garvin's (1980) model complements the non-economic models and; 1) assumes

administrators and faculty pursue self-interests, 2) is set in a market context, and 3) focuses not on social and structural characteristics but on economic characteristics and the behavior implications of different sources of revenue and costs.

Prestige is linked with quality but there is an important distinction made by Garvin (1980). Actual quality, though difficult to measure, is less important than prestige because "reputation… guides the decisions of prospective students" (Garvin, 1980, p. 15). Increased prestige leads to better reputation expanding the geographic area in which a university can compete. Higher prestige also results in less elastic demand which leads to higher net tuition revenues without a decline in quality due to the loss of operating funds associated with steep tuition discounting (Garvin, 1980).

Garvin asserted his model was general and could include universities pursuing prestige and quality students as well as those maximizing enrollments with minimum standards to survive financial challenges (1980). Similarly, Hopkins and Massy (1981) allow flexibility in modifying qualitatively measured values when constraints force change. However, long-term goals may be lost at the expense of short-term value modification. A quality and quantity trade-off occurs when "universities compete with one another in 'tuition-prestige' space, offering particular combinations of the two in an effort to attract students" (Raines and Leathers, 2003, p. 199). Ehrenberg (1999) characterized Garvin's utility-maximizing model as describing "'fairly well the behavior of small liberal arts colleges which typically lack separate centers of power" (p. 101).

Another economic model, similar to Garvin's idea of prestige maximization, asserts the purpose of colleges and universities is to maximize value fulfillment (Hopkins and Massy, 1981 and later Massy, 2003). Like Garvin (1980), this model allows for a broad definition of value fulfillment which "need not depend on quantification - anything the academy cares about can be accommodated under the value rubric" (Massy, 2003, p. 33). This ambiguity of goals was also described as "fuzzy objectives" (Winston 1999, p. 15). This pursuit of value fulfillment is subject

to three constraints; the student market, production costs and processes, and finance (Hopkins and Massy, 1981 and Massy, 2003).

The student market provides revenues from both tuition and federal and state student grants. At private baccalaureate colleges, tuition revenue accounts for roughly 80 percent of total revenue (McPherson and Schapiro, 1994). These tuition-dependent colleges are forced to carefully consider their students' willingness or ability to pay when developing a pricing strategy and financial aid. Generally, demand for student spots at the most prestigious colleges is relatively inelastic – demand is steady when price increases. These highly selective colleges provide a pricing umbrella for all other schools (Massy, 2003, p. 41; Litten, 1984). Despite similar gross tuition prices, there is price competition. Institutional merit aid or tuition discounting allows less selective private colleges to adjust their net tuition price to attract a sufficient number of students. Price discrimination is one reason gross tuition has risen faster than the rate of inflation and rate of increase in net tuition revenues. The increase in sticker price attributable to financial aid rose from 40 percent in the late 1980s to 60 percent by the mid-1990s (Winston, 1999).

Gross tuition or sticker price remains sufficiently high to signal high quality to consumers. When an institution attracts high quality students, it is more likely to attract the next generation of high quality students, and the less likely it will need to discount tuition to maintain enrollment (Monks and Ehrenberg, 1999). Institutions successful at increasing student quality are more attractive to donors and prospective faculty.

The pressure for attracting and enrolling quality students has resulted in increased efforts to generate donative resources. Without gifts and adequate endowments, colleges become more tuition dependent and are forced to behave more like for-profit firms. According to the Hopkins and Massy (1981) model, tuition will be reduced as gifts and endowments increase. The reality is quite the opposite. Despite increased endowments, tuition rates continue to climb higher than the rate of inflation and capital campaigns have more ambitious goals (Winston, 1999). Tuition is

not decreased when endowment earnings or gifts increase but it continues to increase when endowments and gifts decrease. Additional funds are rarely seen as a way to pass savings along to students but rather to spend more on programs and buildings to enhance value or prestige. Instead, tuition revenue as a percentage of total revenue decreases when gains are made in endowment and gifts.

Institutions need revenues to cover the cost of operations. Rising college costs are the source of much investigation by commissions and Congressional hearings (National Commission on Responsibilities for Financing Higher Education 1993, National Commission on the Cost of Higher Education 1998, United States Senate Committee on Governmental Affairs, Hearings on the Rising Costs of College Tuition and the Effectiveness of Government Financial Aid, February 9-10, 2000, The Spellings Commission, 2006). The pursuit of prestige, however, is costly and only constrained by available revenues (Bowen, 1980). Covering costs is difficult because costs almost always increase through inflation and/or competitive pressure to spend (Massy, 2003). There is little incentive to cut costs because colleges must pay for the highest quality faculty as well as programs and amenities that enhance prestige. This positional arms race is an unending pursuit (Winston, 2000).

Higher education is often accused of being inefficient but cost efficiency is not likely to result in savings or tuition reductions. To understand the critique a distinction ought to be made between efficiency and productivity (Massy, 2003). Efficient means production occurs at the "least cost possible given the state of the art" (Massy, 2003, p. 47.) Colleges are efficient at delivering traditional classroom instruction limited by some self-defined expectation of quality. Productivity "means enhancing the state of the art" (Massy, 2003, p. 47). Higher education has not benefited from the same production improvements in other industries (Baumol and Bowen, 1966). In part, production limitations explain the routine two to three percent increase in tuition rate over the rate of inflation (Ehrenberg, 2000). For example, there exists only so much classroom space to house students and their instructors. Building more classrooms increases

capital and operating expenditures and requires the use of savings or debt. Also, increasing the student-faculty ratio is one way to be more productive but this strategy runs contrary to prestige and/or quality enhancement. Any gains through improved efficiency or productivity are most likely transferred to other prestige-enhancing activities than to tuition reduction (Massy, 2003). On the other hand, when costs increase (energy, salaries, library), colleges are likely to pass the added costs along to students in the form of tuition increases.

Revenues must equal or exceed expenditures over a long-term time horizon for a college or university to continue. A nonprofit philosophy indicates that revenues equal expenditures. The absence of profit motive does not mean nonprofit colleges do not attempt to generate surpluses or avoid deficits. The legal restrictions on nonprofit organizations prohibit the distribution of surpluses to stockholders in the form of dividends, but the surpluses can be reinvested in new programs, endowments, or reserves (Massy, 2003). Endowments or accumulated surpluses, coupled with debt capacity, allow an institution to pursue an aggressive growth strategy or withstand adverse economic conditions for a period of time. The Hopkins and Massy (1981) economic theory focuses on the relations among institutional values, revenues, expenditures and financial and capital resources over a long-term time horizon.

Financial Analysis

The economic theories (Bowen, 1980; Garvin, 1980; Hopkins and Massy, 1981; and Massy, 2003) have several commonalities that provide a basis for financial analysis.

First, the pursuit of profits by the for-profit firm is replaced with the pursuit of prestige, value, excellence, or survival. Second , the pursuit of prestige is constrained as it requires expenditures (costs) supported by revenues from several sources (tuition, gifts, endowment income) as well as financial and physical resources (endowment principal; property, plant, and equipment; debt financing). Third, long-term equilibrium is necessary - an institution’s revenues

must equal or exceed its costs over the long-term or it will fail. The economic activities of colleges and universities create information recorded in the accounting systems and reported in the annual financial report and financial statements. This accounting information is a summary of past events and measures how an institution chooses to pursue prestige/value/survival by summarizing revenues earned and expenditures incurred. The financial report also provides information on the financial and physical resources used in pursuing its goals. This information is used to make strategic decisions. The financial analysis literature is congruent with economic theories of higher education. Financial analysis considers all elements of the financial report, including; revenues, expenditures, financial and physical assets, liabilities and debt, and net assets.

Because of the broad range of institutional types and control coupled with the unique nature of revenues and costs, financial analysis in higher education can be challenging. One of the most effective ways to assess financial condition is ratio analysis and has long been used by for-profit enterprises. Ratio analysis considers the relationship between two numbers in the financial statements and allows for both trend and comparative analyses. Trend analysis identifies trends in a particular ratio at one institution and helps guide strategy by measuring past performance and charting progress on goals and objectives. Comparative analysis is useful because financial data are scaled to allow comparisons between different institutions. Financial ratios provide more useful information than considering only absolute dollar value measures from the financial statements. For example, the amount of total expenditures is meaningless without considering whether current resources are sufficient to meet them. Additionally, ratio analysis can provide common benchmarks for financial condition and guides financial decision-making.

The literature on financial ratio analysis is based heavily in a for-profit context. For corporate enterprises, financial ratio analysis provides a means of comparison to competitors in the same industry. Profitability is the primary goal for corporate enterprises. The pursuit of profit is subject to market forces of production and consumption. What resources can be produced and

sold to obtain resources? What resources must be consumed to continue production? These business activities provide a framework for financial analysis in the for-profit sector.

Generally, financial condition is the result of measures in five critical areas of an organization; profitability, liquidity, leverage, asset efficiency, and market value (Fraser and Ormiston, 2007; Wild, Subramanyam, and Halsey, 2007). Profitability, the excess of revenues over expenses, is the primary goal and one element of financial condition of for-profits and it is supported by the other elements of financial condition (Fraser & Ormiston, 2007). Liquidity is the ability of the organization to meet its short run obligations and provides a measure of the flexibility in making adjustments for changing market conditions and opportunities. Leverage concerns the amount of debt and the ability to pay debt over the long and short runs. Operating efficiency refers to how well management uses assets, both capital and financial, to enhance profitability over time. For-profits have long used this comprehensive approach to assessing financial condition.

For many for-profits, a lack of adequate revenues or failure to enhance productivity may quickly lead to financial disaster. However, colleges and universities have several sources of revenue coupled with reserves to help weather short-term financial crises. Additionally, productivity gains and the related cost reductions found in the for-profit sector are difficult given the nature of the traditional educational enterprise. Due to the differences between nonprofit higher education and the corporate sector, standard for-profit ratio analysis is not directly applicable to colleges and universities. This incongruence was a problem for previous attempts at assessing financial condition in higher education (Frances and Stenner, 1979; Collier, 1982). A framework for nonprofit higher education financial analysis understands the economic peculiarities of higher education.

There are forms of financial ratio analysis aimed at government and nonprofit organizations (Wilson and Kattelus, 2004; Groves and Valente, 1994) and more specifically at private and public colleges and universities (Prager, Sealy & Co., KPMG & Bearing Point, 2005;

Collier and Patrick, 1979; Dickmeyer and Hughes, 1982; Chabotar, 1989; Meyerson and Johnson, 1993). In *Strategic Financial Analysis for Higher Education* (*SFAHE*), the authors translate several of the analysis areas from the for-profit context in developing the most comprehensive framework for strategic financial analysis in higher education; operating results (profitability), resource sufficiency and flexibility (liquidity), financial resources including debt (leverage), and asset performance (asset efficiency) (Prager, Sealy & Co. et al., 2005).

The *SFAHE* framework is useful for college management, trustees, and other higher education industry organizations. Credit ratings organizations like Moody's Investors Services (2007) are concerned with an institution's creditworthiness, the ability to repay debt. They assign a rating based on their assessment of a college's financial condition using the same or similar ratios as the ones described in *SFAHE*. The U.S. Department of Education (DoE) seeks to identify institutions that might bear risk to student financial aid programs. The DoE uses three ratios (also in *SFAHE*) to assess an institution's viability, profitability, liquidity, ability to borrow, and capital resources (KPMG Peat Marwick, 1996). Institutionally, higher education executives and trustees use financial ratios to assess progress toward goals and objectives and to make decisions for the future. The Council of Independent Colleges developed a Financial Indicators Tool (FIT) using the Composite Financial Index developed in *SFAHE* (Hartley, 2009).

THE *SFAHE* framework for financial analysis, developed over several editions since the late 1970s, suggests financial analysis should not focus simply on the mechanics of computing financial ratios but should address four high-order questions in determining overall financial health (Prager, Sealy & Co. et al., 2005, p. 4):

1. *Are resources sufficient and flexible enough to support the mission?*
2. *Are financial resources, including debt, managed strategically to advance the mission?*
3. *Does asset performance and management support the strategic direction?, and*
4. *Do operating results indicate the institution is living within available resources?*

Overall financial health represents an institution's current and continuing capacity to successfully operate. Again, it is not the absolute level of resources (dollar value) but how the resources are used to achieve strategy (relationships between financial statement items). Overall financial health includes success in the following areas; resource sufficiency and flexibility, financial resources including debt, asset performance, and operating results (Prager, Sealy & Co. et al., 2005).

Resource sufficiency and flexibility concerns the length of time the institution can function without generating additional resources. Having sufficient and flexible resources allows for growing existing or creating new programs, improvements or additions to current physical plant, and allows for a margin of protection during times of adversity.

Financial resources including debt measures the use of debt as a tool in achieving strategic goals. Analysis in this area addresses the following questions: Are debt payments sized appropriately for the institution?, Are operations strong enough to support the debt?, and What is the institution's debt capacity? Competitive pressures often force expenditures before an institution can save sufficient resources. For example, new or refurbished residence halls are often funded using debt in order to keep up with competitors.

Asset performance addresses the use of physical and financial assets in generating financial returns over time. Higher education is an asset-intensive industry. Institutions must balance maximizing return on investments and reinvesting and renewing its physical assets. For example, the new science building must attract more students and faculty of higher quality to generate more prestige.

Operating results are often the focus of higher education research. This area concentrates on the balance between revenues and expenditures. Over the long run, colleges and universities must operate at a surplus or breakeven position. This should not be confused with a for-profit's annual profits. Surpluses are needed to reinvest in college initiatives. Annual deficits are

generally avoided but there are times when a short term deficit is intentionally generated if it is considered an investment in the future.

The *SFAHE* framework is similar to several other frameworks of financial analysis in higher education. Collier and Patrick (1979) identified six dimensions of financial condition; 1) revenue drawing power, 2) financial independence, 3) risk, 4) revenue stability, 5) financial flexibility, and 6) reserve strength. The Dickmeyer and Hughes (1982) model of financial condition is based on four broad categories: financial strength, estimated risk, changes affecting financial resources, and changes in nonfinancial resources. Similarly, Chabotar (1989) organized ratio analysis into five categories: liquidity, debt capacity, sources of funds, uses of funds, and net operating results. Meyerson and Johnson (1993) suggest key ratios to measure liquidity, operating performance, and wealth.

This study's financial analysis framework is similar to those previously discussed and includes the following elements: liquidity and flexibility, leverage, asset performance, operating results, and market position. See Table 2-1 for a comparison of this study's financial analysis framework with others.

Table 2-1: A Comparison of Selected Financial Analysis Frameworks

	For-profit		Higher Education			Government
This study's framework:	**Fraser & Ormiston (2007)**	**Wild, Subramanyam, & Halsey (2007)**	**Prager, Sealy & Co., KPMG, & Bearing Point (2005)**	**Chabotar (1989)**	**Moody's Investor Services (2002)**	**Wilson & Kattelus (2004); Groves & Valente (1994)**
Liquidity & Flexibility	Liquidity	Liquidity	Resource Sufficiency & Flexibility	Liquidity	Financial Position (Liquidity)	Operating Position (Liquidity & Reserves, Fund Balance)
Leverage	Leverage (Debt)	Capital Structure & Solvency	Debt Management	Debt Capacity	Debt Position & Legal Structure	Debt Structure
Asset Performance	Operating Efficiency (Asset Management)	Return on Investment, Asset Utilization	Asset Performance and Management		Financial Position (Financial Assets)	Unfunded Liabilities, Condition of Capital Plant
Operating Results	Profitability	Operating Performance	Operating Results	Sources of Funds, Uses of Funds, Net Operating Results	Operating Performance	Revenues, Expenditures
Market Position	Market Measures	Market Measures			Market Position	Environmental Factors
					Strategy & Management	

Financial Condition in Higher Education

Several empirical studies of financial condition in higher education were pessimistic about the ability of small private baccalaureate colleges to survive. The bulk of these studies reflected the poor economic conditions facing small private colleges during the late 1960s and 1970s. Unfortunately, many of these studies used only operating measures (revenues and expenditures) to define financial condition.

Cheit (1971) analyzed the financial condition of 41 colleges and universities at the end of the 1960s. In his study, he used a combination of operating results and changes in assets and

found that enrollment doubled from 1958 to 1968 but general expenditures tripled and plant expenditures quadrupled. Twenty-nine of 41 colleges were considered endangered. Seven of 11 private colleges met that distinction. However, all endangered colleges are still in existence in 2009.

Another study used the decrease in revenue from 1973 through 1976 as the financial condition indicator (Chaffee, 1984). During this period, twenty-nine percent of private institutions saw enrollment declines and 25 percent saw a decline in revenues of more than 5 percent. In a follow-up, case studies of eight colleges indicated resilient colleges had lower tuition dependency, larger endowments, steady enrollment and larger deficits (Chaffee, 1984). Weaker institutions overestimated large enrollment growth and overbuilt physical plant financed largely with debt. The addition of physical plant also increased maintenance and repair expenditures.

Using small private colleges, Lomax and Wilson (1986) developed a regression model including both financial and nonfinancial measures designed to predict college failure, defined as ceased operations, merged or converted to public support. The model was correct in over 85 percent of cases. But the study identified only 72 failed colleges from the 1970s. This study was one of the first studies to find a statistically strong relationship between financial and nonfinancial variables in higher education (ex. high quality academic reputation results in higher revenues). Tuition optimization models for tuition pricing also include quality reputation and quality aspiration as variables (Martin, 2003).

Breneman (1994) analyzed more than 200 private liberal arts colleges at the end of the 1980s. He used net tuition revenue, endowment size, and enrollment as indicators to rank colleges. He concluded the bottom 20 percent were endangered. All endangered colleges were still operating in 2009.

Hoxby (1997) examined the effect on tuition of the changing market structure of higher education from 1949-1991. She examined tuition, expenditures, residence, admissions test scores, and enrollment data from 1121 colleges (731 were private). She found tuition was affected by the pursuit of prestige. Although tuition has risen faster than the rate of inflation since the end of WWII, the increases are larger at higher quality, more prestigious colleges than their lower quality counterparts. High selectivity, related to prestige, has a large effect on tuition (Hoxby, 1997). The tuition gap between high quality and lower quality colleges has widened steadily since 1940.

Tuition Models

Some research has attempted to model the relationships between tuition and various financial and nonfinancial variables. Tuition determination studies use tuition or tuition rate as the dependent variable. Rusk and Leslie (1978) developed a model of tuition rates using data from 50 public institutions. This study used 22 independent variables classified as either internal (institutional costs) or external (market-based) variables. They found institutional costs less subsidies, average state tuition rate, and enrollment proportions between four-year and two-year public institutions to be significant predictors of tuition rates. Rusk and Leslie (1978) did not find significant relationships between tuition rate and presence of faculty unions, student aid, institutional quality, and statewide per capita income.

Similar to Rusk and Leslie (1978), Cunningham and Merisotis (2002) also consider the relationships between different types of costs, revenue sources, tuition, price, and market variables for both public and private institutions. At public universities, both decreasing state appropriations and increasing instructional expenditures were associated with tuition increases. For private institutions, institutional aid, faculty compensation, and the tuition price of public

competitors were positively associated with higher tuition levels (Cunningham and Merisotis, 2002). They found significant and negative associations between endowment income and tuition and private gift income and tuition. Institutional aid (tuition discount) was significantly and positively related to tuition at comprehensive and bachelor's institutions.

Harford and Marcus (1986) examined the relationships between twenty institutional quality variables and tuition at private colleges. Using a cross section of 780 private colleges and data from *Lovejoy's College Guide*, they found significant and positive relationships between tuition and average SAT scores, number of majors offered, public tuition of the top public university in state, percentage of students living on campus, and age of institution. Additionally, there were significant and negative relationships between tuition and the percentage of black students enrolled and religious affiliation. Since their cohort indicated 40.5 percent of students came from out of state, Harford and Marcus (1986) assumed this is indicative of regional markets for higher education. They ran regression models for each of four regions: Northeast, East North Central, South, and West/West North Central. They found "each region is significantly different from the national sample" (pg. 425). Most notably, public college tuition is positive and statistically significant in the national model but not in the Northeast model. Public tuition in the South and West and West North Central regions has a positive and statistically significant relationship with private college tuition. The Northeast differs from these regions in that the Northeast has the lowest proportion of public-to-private colleges of any region.

Using time-series data from 1960 to 1986, Paulsen (1991) examined the determinants of overall average tuition at U.S. colleges and universities in the private and public sectors. The discussion here will focus on the results of the private sector. Using price theory from microeconomics, he used a simultaneous equations model for both demand (external) and supply (internal) models. Demand factors include the quantity students desire; their income or ability to pay; their expected utility (perceived benefits, rewards, or returns) from the service; and the

number, size, and price behavior of competitors. Supply factors include the quantity to be supplied, the prices and quantities of resources needed to provide the service, non-tuition revenues, and the productivity or quality of the resources employed. Paulsen (1991) found public tuition, per capita disposable income, the ratio of college degree jobs to total jobs, relative price index (Higher Education Price Index divided by the Consumer Price Index), and institutional expenditures were all significantly and positively related to tuition. Endowment income plus annual giving and federal grants relative to state and institutional grants were significantly and negatively associated with tuition. Both demand and supply models had an R-square of 0.98.

From the accounting literature, Brown (1994) used non-tuition revenues, total expenditures, religious affiliation and surplus (or deficit) in determining tuition rate. He found institutions with a one-year surplus to have lower tuition rate increases in the subsequent year and lower expenditures per student. Conversely, institutions with one-year deficits had greater tuition rate increases in the subsequent year. He asserts that institutions tend to regain revenue-expenditure equilibrium annually, not over the long-term. This indicates a reactive, not proactive, approach to setting tuition. His study included neither asset nor debt variables.

Koshal and Koshal (1999) studied 338 private liberal arts colleges from 1990 through 1991. They found "the quantity of students, cost of education, average Standardized Aptitude Test (SAT) Score, class size, and ranking of the institutions explain variation in tuition at the liberal arts colleges" (p. 121). Using data from *Lovejoy's College Guide*, the *Insider's Guide to Colleges* and the *USN&WR* 1992 rankings they compiled and/or computed the following variables; tuition, full-time equivalent students (FTE), average cost, class size, church affiliation, average SAT scores, *USN&WR* rank, and Carnegie classification. Their results indicated that "after controlling other factors, it can be concluded that parents and/or students are willing to pay a premium of $4193 for first-ranked colleges, $4,176 for second-ranked, $2,985 for third-ranked, and $1,625 for fourth-ranked liberal arts colleges" over that paid for colleges ranked outside the

top 100 (Koshal and Koshal, 1999, p. 127). The *USN&WR* rankings include several finance variables.

Dimkpah, Eseonu, and Akpom, (2004) found that two factors drive price, the "ability of colleges to supply various education characteristics and the willingness of students to pay" (p. 1). Distortions, in the form of subsidies, grants and financial aid received by students affect their marginal willingness or ability to pay. Their study of more than 600 private four-year colleges used annual gross tuition as the dependent variable. The independent variables of interest to proxy quality were; proportion of graduate students, year founded, highly competitive or moderately competitive (as ranked by *Peterson's* and *Baron's* guides), percentage of faculty with doctorates, library size, and student-faculty ratio. Five of the seven quality variables were significant at a p-level less than or equal to 0.01. Proportion of graduate students and library size were not significant. The highly competitive and moderately competitive variables were significant and strong predictors of tuition. Controlling for other variables in the model, highly competitive colleges had nearly four times the effect on tuition as moderately competitive colleges. The authors found that geographic location also played a role in setting tuition. Colleges in the South and Midwest have significantly lower tuitions than do colleges in the more competitive Northeast.

The studies outlined above demonstrate the difficulty in understanding financial condition. Few studies considered financial or physical resources and none considered debt. Again, revenues and expenditures from the statement of operations, used in all of the studies, are short-run results. Balance sheet resources, like assets and debt, are equally important in determining institutional strategy.

Also, none of the studies used ratio analysis, relating one financial statement measure to another, to scale their data for better institutional comparisons. Many used dollars per student computations to scale their data. The dollars per student scaling is limited for three reasons.

First, different missions and strengths may exist at similarly classified institutions. For example, a private baccalaureate college with strength in the natural sciences is likely to have higher costs than a college with a large humanities program despite serving the same number of students. Second, the dollars per student scaling reveals little about the linkages between certain financial statement items and how resources are deployed. For instance, instructional expenditures per student is relevant only when considering the relationship of instructional expenditures to total revenue or total expenditures. Per student scaling does not address how well an institution lives within its means but rather where it ranks relative to other institutions in a particular expenditure or revenue category. For example, a college with the largest expenditures per student is not necessarily in poor financial condition because it may also have the largest endowment and/or greatest revenue diversity. Nor is it necessarily providing the highest quality education simply because it spends more than its competitors. Finally, variables scaled by students are endogenous. The institution can control the number of students they choose to enroll.

Summary

Private baccalaureate colleges have proven especially resilient given the numerous financial challenges they have faced. These institutions have been thoroughly criticized for being costly, inefficient, and unable to use sophisticated managerial techniques to operate. To better understand how these colleges determine and use their financial condition to guide strategy, research must better define financial condition based on a solid framework. Much of the empirical research using financial indicators is incomplete in that the financial measures used are, almost exclusively, operating measures (revenues and expenditures). The research ignores financial resources, physical resources, and debt.

Economic theories of higher education indicate the primary goal of colleges and universities is the pursuit of prestige, value, or excellence. This pursuit of prestige is constrained as it requires expenditures (costs) supported by revenues from several sources (tuition, gifts, endowment income) as well as financial resources (endowment principal), physical resources (property, plant and equipment) and debt. Finally, an institution's revenues must equal or exceed its costs over the long-term or it will fail. The economic activities of colleges and universities create information recorded in the accounting systems and reported annually in the annual financial report and financial statements.

Ratio analysis uses this accounting information and provides information on past performance, progress toward goals and objectives and provides a guide for making future strategic decisions. Ratio analysis considers the relationships between various elements in the financial statements and gives a clearer picture of whether an institution is operating within its means than using isolated financial elements. The financial analysis literature is congruent with economic theories of higher education.

Unfortunately, the existing research on financial condition in higher education is limited in that it uses primarily financial operating measures and ignores institutional resources and it uses financial elements in isolation rather than considering the relationship between financial elements. Additionally, there are very few studies addressing the relationship between financial condition and decision-making (in this context, the annual percentage change in tuition).

This study is designed to address some of the limitations in the existing literature and considers the relationship between comprehensive measures of financial condition and the annual percentage change in tuition at private baccalaureate colleges using data from approximately 450 institutions for the period 1998 through 2008.

Conceptual Framework

Any study of financial condition should be grounded in Accounting Theory. Accounting information provides the basis for financial analysis and the determination of financial condition. Additionally, economic theories of higher education provide the basis for understanding the motivations and decisions of college and university leaders and their constituents.

The Accounting Conceptual Framework, developed by the Financial Accounting Standards Board (FASB) over several years, is a system of interrelated objectives and fundamentals for accounting information. The Framework's pervasive criterion is the *decision-usefulness* of accounting information for users. Accounting information ought to possess the primary quality of *relevance* meaning it provides *predictive* and *feedback* value. In addressing nonprofit organizations, FASB (1980) states:

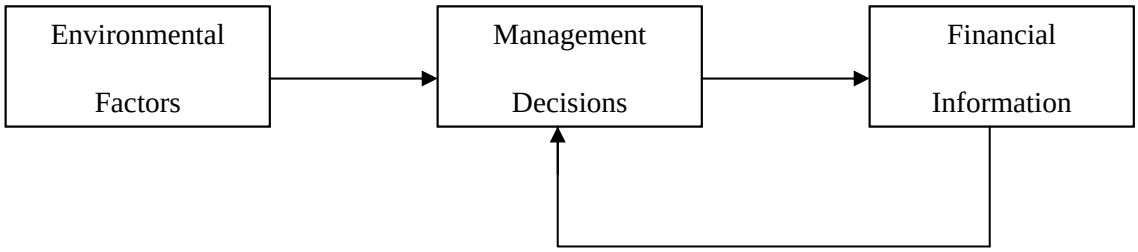
> *Financial reporting by non-business organizations should provide information that is useful to present and potential resource providers and other users in making rational decisions about the allocation of resources. The information should be comprehensible to those who have a reasonable understanding of an organization's activities and are willing to study the information with reasonable diligence" (para. 35).*

Specifically, the accounting information provided by a nonprofit organization should be useful in "in assessing an organization's financial viability, its performance, and how the organization's managers have discharged their stewardship responsibilities" (FASB, 1980, para. 56).

Accounting researchers have long tested the decision-usefulness of accounting information. One branch of Accounting research, Behavioral Research, focuses on "how users of accounting information make decisions and what information they need" (Wolk, Dodd, & Tearney, 2004, p. 42). Various accounting research studies have found accounting information, including financial ratios, useful in predicting stock price, stock returns, dividends, bankruptcy, bond ratings, earnings, viability and leverage (Wolk, Dodd, & Tearney, 2004).

The accounting conceptual framework describes how accounting information drives decision-making. Management also considers environmental information when making decisions. Using local government as the context, Groves and Valente (1994) describe factors affecting financial condition. Environmental factors such as community needs and resources, economic conditions, governmental constraints, natural disasters and emergencies, and political culture determine consumer demand and capacity for providing service. Management sets policy and makes decisions based, in part, on environmental factors. The organizational (managerial) response to the environment is a major factor in determining how environmental factors are translated into financial factors. Financial factors, in the Groves and Valente (1994) framework, include revenues, expenditures, operating position, debt structure, unfunded liabilities, and condition of capital plant. These factors are similar to the financial ratio analysis frameworks discussed previously (see Table 2-1). Financial factors are the result of management policy in response to environmental demands and resources. Figure 2-1 represents the conceptual framework for this study.

Figure 2-1: Conceptual Framework for this study.



Adapted from: Groves, S.M. & Valente, M.G. (1994). *Evaluating financial condition: A handbook for local government*, 3rd ed. Washington D.C.: International City/County Management Association. p.5.

In this framework, both environmental factors and financial information drive management decisions. In this case, however, financial information is both the result of past

management decisions (and indirectly, environmental factors) *and* the feedback driving future management decisions.

Previous studies, particularly tuition models, attempted to carefully separate and define both internal or organizational measures (supply-side) and external or market (demand-side) measures. Methodologically, the attempt to separate gives the illusion of a clear separation between external and internal variables. Conceptually and practically, the separation is impossible. For example, the tuition discount, from the institutional (internal) perspective is a cost but from the student (external) perspective, it is financial aid. Cunningham and Merisotis (2002) developed a simultaneous equation model of tuition-setting. The external and internal equations in their model include some of the same variables, including institutional aid, instructional expenditures, and philanthropic revenue. All variables, although measured from institutional accounting information, include external/market information. As outlined in the conceptual framework for this study, the financial information provides feedback on how institutional strategy fared in the marketplace.

Chapter 3

Methods

The purpose of this study is to examine the relationship between financial condition and tuition rates at private nonprofit baccalaureate colleges over time. The analytical method employed is panel or longitudinal data (also known as pooled cross-sectional time series). This analysis allows for the examination of both dynamic and cross-sectional aspects of financial condition and tuition. In outlining future research on tuition, Paulsen (2001, p. 251) suggested "both time-series and cross-sectional data can be useful… and indeed, pooled time-series and cross-sectional databases may provide a particularly rich opportunity for more comprehensive examinations of rising tuition in particular or the determinants of tuition in general." Additionally, Paulsen (2001, p. 251) calls for "more studies that explicitly specify… changes in tuition as their primary dependent or outcome variable" and the use of "supply-side or cost-related variables" in addition to demand-side variables. This study attempts to incorporate many of these suggestions.

Research Questions

Primary Research Question:

Is financial condition associated with the annual percentage change in tuition at private nonprofit baccalaureate colleges?

Secondary Research Questions:

Are annual *operating results* associated with the annual percentage change in tuition?

Are *liquidity* and *flexibility* associated with the annual percentage change in tuition?

Is *leverage* associated with the annual percentage change in tuition?

Is *asset performance* associated with the annual percentage change in tuition?

Is the *tuition discount* associated with the annual percentage change in tuition?

Data Sources

This study uses data from the Integrated Postsecondary Education Data System (IPEDS) of U.S. Department of Education's National Center for Education Statistics (NCES). IPEDS data is derived from several surveys that must be completed by all institutions that participate in "any federal financial assistance program authorized by Title IV of the Higher Education Act of 1965, as amended" (NCES, 2008). The dependent variable, percentage change in tuition rate, is computed from data in the IPEDS Institutional Characteristics survey. The IPEDS Finance Survey provides all necessary data to compute the independent variables of interest for this study. Finance Survey data is designed "to describe the financial condition of postsecondary education in the nation, to monitor changes in postsecondary institutional finance, and to promote research involving institutional financial resources and expenditures" (NCES, 2008). The data include financial information derived from the colleges' annual financial reports. Specifically, the information originates from each institution's *statement of financial position* and *statement of activities*, which provide feedback for management on previous strategic decisions. IPEDS finance data includes: revenues by source; expenses by function; physical plant assets; total indebtedness; and endowment investments. Additional data comes from the U.S. Department of Commerce and *Barron's Profiles of American Colleges*.

This study is a census as the sample is the entire population of colleges with the Carnegie classifications *Baccalaureate Colleges – Arts & Sciences* and *Baccalaureate Colleges - Diverse Fields* that provided IPEDS data for fiscal years 1998 through 2008. Accordingly, there is no need for a sampling frame or sample size calculations. Five-hundred-three institutions comprise the universe for this study. However, not all of the 503 institutions provided complete data to IPEDS for the entire time period examined by this study. In cases where IPEDS data were missing, inconsistent, or incomplete, the researcher consulted institutions' Form 990s obtained through Guidestar.org. The Form 990 is a mandatory financial filing required by the U.S. Internal Revenue Service of all nonprofit organizations. Form 990 provided some of the necessary data for nearly 30 institutions in this study. Those colleges missing two or more consecutive years of data were eliminated from the study (n=29). Of that group, five colleges closed or merged with other institutions during the time period examined and ceased reporting to IPEDS. Nineteen Puerto Rican and Canadian institutions with locations in the U.S. were also excluded. Finally, one institution was removed because it does not charge tuition (Berea) and two large online colleges were outliers on total enrollment and were removed (Western Governors' and Excelsior). Ultimately, the 503 institutions were reduced to 452.

Variables

The dependent variable, annual percentage change in gross tuition (TC), is calculated by determining the rate of change between the tuition in year $t + 1$ and year $t + 2$ where t is the year of observation, as tuition is often determined early in the academic and fiscal year prior (year $t + 1$) to the start of a new student's enrollment (year $t + 2$) (Brown, 1994). The independent variables of interest are financial ratios chosen to represent the elements of the framework for financial analysis: Operating Results; Liquidity & Flexibility; Leverage; Asset Performance; and

Market Position. Control variables representing the external environment include: college quality, state economic condition, and region.

The net operating revenues ratio (NOR), also known as the net income ratio, represents the annual operating results of the organization. The NOR is similar to the profit margin ratio often computed to evaluate for-profit enterprises. It is calculated by taking the ratio of the change in net assets to total revenue and measures whether a college is living within its resources. A positive value indicates an annual surplus and a negative value indicates an annual deficit. Ideally, the NOR should be at least "two to four percent over an extended time period" (Prager, Sealy & Co. et al., 2005, p. 87). Bond ratings agencies, Moody's and Fitch, and the U.S. Department of Education use this or very similar ratios when evaluating colleges and universities (Fischer, Gordon, Greenlee and Keating, 2004).

Another critical operating measure is the tuition dependency ratio (DEP). This ratio is net tuition revenues divided by total revenues and is an important measure of colleges' concentration risk. Unlike many for-profits, colleges have several revenue streams: tuition and fees; gifts; federal, state and foundation grants; and income from investments and endowment. Institutions that rely on tuition to provide more than 60 percent of their total revenues are classified as tuition dependent (Townsley, 2009). Tuition dependent colleges count on tuition revenue to stay even with or ahead of inflationary pressure but are susceptible to unexpected financial events. When enrollment growth slows, the college will lack the cash necessary to pay expenses. As a result, tuition dependent colleges are more likely to have annual operating deficits (i.e. negative NOR) (Townsley, 2009). Tuition dependent colleges are also more likely to have small endowments putting them at a disadvantage with better-endowed colleges. An endowment allows colleges to draw funds from the endowment investment fund annually to support current operations. Colleges with larger endowments are more financially stable and can weather short-term challenges better than tuition dependent colleges with smaller endowments.

The reserve ratio (RES) measures liquidity and flexibility and is computed by dividing unrestricted net assets by total annual expenses. RES assesses how many months of expenses can be covered by unrestricted net assets. For instance, a RES of 0.50 indicates an institution could cover its expenses, assuming no incoming revenues or other cash inflows, for six months. A similar and more commonly computed measure is the primary reserve ratio (PR) used by college finance and accounting practitioners, Standard & Poor's, Moody's, Fitch, and the U.S. Department of Education (Prager, Sealy & Co. et al., 2005; Fischer et al., 2004). The PR's numerator is "expendable net assets", a value derived from other financial statement figures, one of which is long-term project-related debt (Prager, Sealy & Co. et al., 2005). The PR is not used in this study because IPEDS data reports a value for only total liabilities (i.e. total debt) and does not divide it into short-term and long term components nor does IPEDS indicate whether the debt was incurred for a building project. Recent changes in IPEDS will allow for computation of the PR from 2009 onward. As a result, this study uses the reserve ratio, a ratio similar to the *level of reserves* ratio used in other higher education research (Hudack, 2005) and identical to another common nonprofit organization performance indicator (Wilson and Kattelus, 2004, p. 585).

Representing leverage, the capitalization ratio (CAP) (also known as the equity ratio) indicates whether the organization relies more on equity (known as "net assets" in nonprofit organizations) or debt to finance its operations, and is calculated by taking a ratio of its net assets to its total assets. The CAP is more accurately an inverse measure of leverage. The researcher chose CAP because the ratio is commonly recognized in the higher education finance practitioner literature. The CAP should range from 50 to 85 percent (Prager, Sealy, & Co. et al., 2005, p. 60). Institutions at or below the low end of this range may find it difficult to borrow additional funds while institutions above the high end of the range should consider taking on more debt in an effort to increase future income and wealth. The CAP most closely measures debt capacity (Chabotar, 1989). Again, there are more commonly used measures of debt but IPEDS is limited

in that its finance survey only collects information on total liabilities and provides no further information regarding debt. Particularly in light of the credit market crisis of 2008-2009, future changes in the IPEDS finance survey ought to include more information on debt and related measures such as long-term and short-term status, interest rate, and the percentage of fixed rate versus variable rate debt.

The return on net assets ratio (RNA) is calculated by dividing the change in net assets by the total net assets, and measures asset performance. The RNA is similar to the for-profit financial ratios, return on equity and return on investment. Colleges and universities must possess large amounts of both physical and financial assets to operate. The RNA "furnishes a broad measure of the change in an institution's wealth over a single year" and is the "most comprehensive measure of the growth or decline in total wealth over a specific period of time" (Prager, Sealy & Co. et al., 2005, p. 73). Moody's uses this ratio in evaluating an institution's financial condition (Moody's Investor Services, 2002; Fischer et al., 2004).

The tuition discount (TD) measures students' willingness or ability to pay or a college's market position and is calculated by taking the ratio of total institutional aid (both funded and unfunded) divided by gross tuition revenue. It is the means by which private colleges fill their entering classes (Breneman, Doti, and Lapovsky, 2001). Colleges are engaged in fierce competition to enroll academically talented students and need revenue streams to remain competitive. Prospective students (and their families) have budgetary constraints and expectations of quality that limit their willingness or ability to pay. Colleges, aware of their own fiscal constraints, measure prospective students' academic quality and willingness and ability to pay and adjust the tuition discount accordingly.

Tuition discounting is a common source of concern for private nonprofit baccalaureate colleges. Unlike many for-profit enterprises, colleges cannot easily make short-run adjustments to output (i.e. enrollment). Costs are often committed based on enrollment projections and

capacity before actual enrollment is certain. The college is "designed for a set number of students, which the institution seeks to enroll regardless of changing economic circumstances… forcing all of the market adjustment onto prices" (Breneman, Lapovsky, and Meyers, 2000, p. 89-90).

Ideally, the tuition discount serves as a tool to help maximize total net tuition revenue. However, an increasing tuition discount over a period of time may indicate a problem with the market position of the college (Moody's Investor Services, 2002). As the tuition discount grows faster than the rate of tuition increase, the resulting increase in net tuition is less resulting in possible cash flow shortages. From 1981 to 1996, the rate of increase in institutional financial aid was five times that of the increase in the consumer price index. No other higher education expense category increased nearly half that much (Townsley, 2002, p. 37).

The tuition discount is a measure of market position because there are differential effects of the discount across the higher education prestige hierarchy. Upper-tier colleges can increase the discount with little effect on operations. Colleges with smaller endowments, "have found that the tuition discounts essentially forced upon them by the market" have reduced net cash from tuition (Townsley, 2002, p. 32). Colleges at the low end of the prestige hierarchy accept discounting as a normal part of operations and are forced to give entering freshman large discounts. The most selective colleges generally find low price elasticity for their educational service (i.e. most students want to attend regardless of price).

Using data from the NACUBO Institutional Aid survey (1992 and 2002), and using SAT scores as a proxy for selectivity, Doti (2004) found "schools with lower student selectivity need to give back a high proportion of tuition increases to students in the form of discounts (financial aid) than do higher selectivity schools" (p. 363). He determined "selective schools would therefore have more market power… than non-selective schools in retaining a greater proportion of total tuition as net tuition" (Doti, 2004, p. 366). From 1992 to 2002, tuition increased 62.8

percent at high selective colleges, 70.4 percent and medium selectivity colleges, and 74.8 percent at low selectivity schools (Doti, 2004). The tuition discount (institutional aid) increased 98.8 percent at high selectivity colleges, 100.3 percent at medium selectivity colleges, and 163.6 percent at low selectivity colleges (Doti, 2004). Additionally, the percentage of freshman receiving discounts at low selectivity schools was 90.5 percent compared to 60.2 percent at high selectivity schools (Doti, 2004). High selectivity schools had an average discount rate of 33 percent versus 44.7 percent at low selectivity schools (Doti, 2004). Furthermore, the rate of increase in the tuition discount has been the slowest among the top-ranked institutions; "top-ranked institutions tend to aid fewer of their students, have an overall lower discount rate and a higher average gross tuition rate, and yet provide relatively higher amounts of institutional aid to their aided students" (Loomis-Hubbell & Lapovsky, 2004, p. 5). This circumstance may be true because lower selectivity colleges (i.e. less prestigious) are less likely to enroll students from high income families and are forced to offer more aid than higher selectivity (i.e. more prestigious) colleges.

These independent variables of interest together offer a reasonable appraisal of a college's financial condition. These variables will be weighted according to the timing of the tuition-setting decision. For instance, College A will set tuition for the 2009-2010 ($t + 2$) academic year during the early part of the 2008-2009 ($t + 1$) academic year. When the decisions are made, the completed financial statements for 2007-2008 (t) are available as well as partial financial data from 2008-2009 ($t + 1$). This process is similar to that described in Brown's (1994) study of tuition and accounting measures. At the time colleges set tuition, all twelve months of data for the prior fiscal year and approximately four months of the current year's fiscal data are available. Hence, year t independent financial variables will receive a weight of 0.75 while year $t + 1$ variables will receive a weight of 0.25. This allows for the independent variables of interest to have roughly the same scale as before, as the weights sum to 1, while the 3:1 ratio is

consistent with a full year's worth of year *t* information and four months' worth of year *t + 1* information. To address the robustness of the 3:1 weighting scheme, this study will compare it to a model using a 1:1 weighting scheme.

In addition to the financial variables on interest, three control variables will represent the external environment in which the colleges operate: college quality, state economic condition, and region.

Previous studies found a significant relationship between tuition and institutional quality (Koshal et al., 1999; Dimkpah et al., 2004). Most researchers define a high quality college as one that practices a high degree of selectivity in admissions, and some use SAT scores of incoming freshman as the indicator of admissions selectivity. Usually mean SAT score is used alone and entered as a linear score in a regression model (Koshal et al., 1999; Bowen and Bok, 1998; Dale and Krueger, 2002; Loury and Garman, 1995).

A popular alternative to mean SAT scores has been authoritative classifications of college selectivity, like *Barron's Profiles of American College, Peterson's Guide to Colleges, and USN&WR* College Rankings (Brand and Halaby, 2006; Dimkpah et al., 2004; Monks, 2000; Koshal et al., 1999; Brewer and Ehrenberg, 1996; Brewer, Eide, and Ehrenberg., 1999; Kingston and Smart, 1990). Both SAT scores and authoritative national rankings "generally yield highly comparable lists of elite colleges" (Brand and Halaby, 2006, p. 759).

The measure of college quality to be used in this study is taken from *Barron's Profiles of American Colleges*. Barron's reports a single summary measure of selectivity (non-competitive, less competitive, competitive, very competitive, highly competitive, and most competitive) based on the entering class's SAT and ACT scores, class rank, high school grade point average, and the percentage of applicants who were accepted. This ranking is indicative of a college's place in the competitive market for students – the more selective the better. A series of six dummy variables are included in the model to represent non-competitive, less competitive, competitive, very

competitive, highly competitive, and most competitive colleges. The 1998, 1999, 2001, 2003, 2005, 2007 *Barron's* selectivity rankings are used. For the purposes of this study, it is assumed the Barron's rankings for 2000, 2002, 2004, 2006, and 2008 are the same as the preceding year. There is evidence of a high degree of correlation across time in the selectivity ranking of colleges and universities (Hoxby, 2009; Kingston & Smart, 1990).

Percentage change in state per capita income is a representative measure of the economic condition and purchasing power of the population of the state in which the college is located. Cunningham and Merisotis (2002) found state per capita income had a positive and statistically significant relationship to tuition levels. Paulsen (1991) found disposable personal income was significantly and positively related to private college and university tuition.

Previous research indicates a significant relationship between region/geographic location and tuition (Dimkpah et al., 2004; Harford and Marcus, 1986) and region and costs (Toutkoushian, 1999) indicating regional markets exist for students. For this study, regions are defined as follows: Northeast, South, Midwest, and West. Dimkpah et al. (2004) used this same partitioning in their study of tuition. See regional categories in Figure 3-1. See Table 3-1 for an overall summary of variables.

Figure 3-1: Region Definitions

NORTHEAST: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VT
MIDWEST: AI, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI
SOUTH: AL, AR, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX, VA, WV
WEST: AZ, CA, CO, ID, MT, NM, NV, OR, UT, WA, WY

Multicollinearity is often an issue when using economic and financial variables. The presence of multicollinearity allows the researcher to determine the relationship of all independent variables, in unison, with the dependent variable. However, a model with a high

degree of multicollinearity does not produce valid results about any single independent variable. The design of the model attempts to address this potential problem by using only one ratio from each element of financial condition (operating results, liquidity and flexibility, leverage, asset performance, and market position) to avoid redundancy (Chun and Ramasamy, 1989). Additionally, using a large amount of data – eleven years of data from 452 colleges – may minimize multicollinearity by reducing the standard errors in the related independent variables.

Nevertheless, the researcher made efforts to identify the presence of multicollinearity by looking for 1) strong correlations between independent variables and/or 2) a model with a large R-squared but no statistically significant independent variables. Additionally, the researcher subtracted and added independent variables to the model to assess changes in the coefficients of other independent variables. Computing *tolerance* and the *variance inflation factor* (VIF) are additional means of identifying the effect of collinear variables on standard errors. A tolerance less than 0.40 and a VIF greater than 2.5 indicate multicollinearity (Wooldridge, 2002). In the event multicollinearity is present, common options include leaving the model as is, removing a redundant variable, transforming one of the collinear variables, creating a composite variable, and including more data (either more institutions from a comparable Carnegie classification or additional years of IPEDS data for the existing cohort). Please see further discussion of multicollinearity and VIF testing in Chapter Four.

Table 3-1 Summary of Variables

Variables:	**Name**	**Financial Analysis area**	**Computation**	**Description**
Dependent (TC)	Percentage Change in Gross Tuition (year *t +2*) (in nominal terms)	Decision outcome	= (year *t+2* tuition – year *t+1* tuition)/year *t+1* tuition	All financial data from year *t* and partial financial data from year *t+1* will be available when the tuition is set for year *t+2* during year *t+1*
Independent (NOR)	Net Operating Revenues Ratio (year *t*)	Operating Results	= change in net assets/total revenues	Is the college living within its resources?
Independent (DEP)	Tuition Dependency (year *t*)	Operating Results	=net tuition revenue/total revenues	Does concentration risk exist?
Independent (RES)	Reserve Ratio (year *t*)	Liquidity & Flexibility	= unrestricted net assets/total expenses	How many months of operating expenses can be covered by unrestricted net assets?
Independent (CAP)	Capitalization Ratio (year *t*)	Leverage	= net assets/total assets	Does the organization rely more on equity or debt to finance operations?
Independent (RNA)	Return on Net Assets Ratio (year *t*)	Asset Performance	= change in net assets/total net assets year *t -1*	Does asset performance support the strategic direction?
Independent (TD)	Tuition Discount (year *t*)	Market Position	= institutional aid/gross tuition revenue	How much are students willing to pay?
Independent Control (COMP)	Six dummy variables for *Barron's* selectivity rankings (non-competitive, less competitive, competitive, very competitive, highly competitive, and most competitive)	College Quality	0 = no 1 = yes	
Independent Control (PCI)	Percentage change in State Per Capita Income	State Economic Condition	percentage change	
Independent Control (REG)	Dummy variables for Northeast, Midwest, South, and West	Region	0 = no 1 = yes	

Analysis

Since this study uses financial data from 452 colleges over the period from 1998 through 2008, it employs longitudinal or panel data analysis or, known more commonly in the social science literature, pooled cross-sectional time series analysis. The most important advantage of using panel data analysis is the ability to account for both spatial (individual college) and temporal (time) effects in addition to the effects of the independent variables. However, using panel data analysis is more complex than using either cross-sectional or time series alone.

This study is a correlational design that assesses the relationship between variables over time. Because there are both cross-sectional and time-series components to this analysis, two-dimensional panel data are used. As a variety of financial criteria are being used in the study, technically it involves a series of correlational designs, one for each variable. This allows for a better understanding of the relationships between the independent variables and the dependent variable (percentage change in tuition). This study uses five main independent variables representing financial condition: operating results, liquidity & flexibility, leverage, asset performance, and market position. The panel data analysis is used to investigate the research questions.

With panel data, three different types of methodological models can be conducted; pooled, fixed, and random. Pooled data generally do not work for this sort of analysis because there are likely to be cross-sectional or time effects, and using pooled data assumes that such effects do not exist. A fixed effects model would be problematic if this were not a census because it involves constructing a series of dummy variables for each cross-sectional effect, and with 452 data points, the standard errors would become massive, and it would be hard to determine any significant effects (Wooldridge, 2002). However, Kennedy (1998, p. 227) states

"if the data exhaust the population, then the fixed-effects approach, which produces results conditional on the units in the data set, is reasonable." The random-effects approach is more useful when values are sampled from a larger population and are then used to generalize to that population. This study is a census of private nonprofit baccalaureate colleges in the U.S.

Therefore, the desired type of regression for this model is a fixed effects model. The most complex such fixed effect model would allow for correlations between the cross-sectional data, time, and the dependent variable, which would provide the most accurate result; however, it would diminish the degrees of freedom substantially (Wooldridge, 2002). Nonetheless, taking into account all effects is advisable because colleges have their own histories and financial situations that differ from each other and may be associated with their region, size, or other institution-specific factors. For instance, it is likely that colleges were doing better when the American economy was generally prospering in 1998 and 1999 than they were in 2002 in the aftermath of the 2001 recession.

Model

In the pooled or common effects model, it is assumed the intercept is common for all colleges in all years. This is not normally a realistic assumption for panel data but ought to be tested against the fixed-effects model.

The pooled model in this case is defined as:

$$TC_{it} = \alpha_{it} + \beta_1 NOR_{it} + \beta_2 RES_{it} + \beta_3 CAP_{it} + \beta_4 RNA_{it} + \beta_5 TD_{it} + \beta_6 DEP_{it} + \beta_7 COMP_i + \beta_8 PCI_{it} + \beta_9 RGN_i + e_{it}$$

Where:

α_{it}	=	intercept
TC_{it}	=	percentage change in tuition rate for college *i* in year *t*
NOR_{it}	=	weighted net operating revenues ratio for college *i* in year *t*
RES_{it}	=	weighted reserve ratio for college *i* in year *t*
CAP_{it}	=	weighted capitalization ratio for college *i* in year *t*
RNA_{it}	=	weighted return on net assets ratio for college *i* in year *t*
TD_{it}	=	weighted tuition discount for college *i* in year *t*
DEP_{it}	=	weighted tuition dependency ratio for college *i* in year *t*
$COMP_{it}$	=	series of six dummy variables representing *Barron's* competiveness rankings for noncompetitive, *less competitive*, *competitive*, *very competitive*, *highly competitive*, and *most competitive* colleges for college *i*
PCI_{it}	=	percentage change in state per capita income for college *i* in year *t*
RGN_{it}	=	series of three dummy variables representing regions (*Northeast*, *Midwest*, and *West*, *South* is omitted) for college *i*
e_{it}	=	random error

Again, the financial variables above are weighted using the 3:1 scheme described previously.

The fixed-effects (also known as the least squared dummy (LSDV)) model allows the intercept term to vary across cross-sectional units. Dummy variables are entered into the model, specifying a different intercept coefficient for each cross-sectional unit, to take into account institutional differences not identified by the other variables.

The fixed effects model is:

$$TC_{it} = \alpha_{it} + \beta_1 NOR_{it} + \beta_2 RES_{it} + \beta_3 CAP_{it} + \beta_4 RNA_{it} + \beta_5 TD_{it} + \beta_6 DEP_{it} + \beta_7 COMP_i + \beta_8 INC_{it} + \beta_9 RGN_i + \mu_i + \nu_{it}$$

Where all other various remain the same and:

μ_i	=	fixed cross-sectional effects
ν_{it}	=	random variable for college *i* in year *t*

Reliability Tests

Calculating the pooled and fixed effects models is necessary to conduct the F-test for the significance of an effect in this model. To run a fixed effect hypothesis test, it is necessary to run an F-test that compares the fixed effect model to the pooled model (Worthington, Higgs, and Hoffmann, 2006) as follows:

$$F_{groupeffects} = \frac{(R_{fem}^2 - R_{pooled}^2)/(n-1)}{(1 - R_{LSDV}^2)/(nT - n - k)}$$

Although the fixed effects model appears to be the best choice *a priori*, a Hausman test must be conducted to statistically determine whether a fixed effects model or random effects model should be used. Statistically, fixed effects are always a reasonable thing to do with panel data (they always give consistent results) but they may not be the most efficient model to run. Random effects will result in better p-values as they are a more efficient estimator, so one should run random effects if it is statistically justifiable to do so. The Hausman test checks a more efficient model against a less efficient but consistent model to make sure that the more efficient model also gives consistent results. The Hausman test tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. This test determines whether there is a correlation between structural and reduced errors; if so, then a fixed effects model should be used; if not, a random effects model is acceptable (Wooldridge, 2002).

Summary

Chapter Three explains the methods used in this study to assess the hypotheses and address the research questions. The correlational analysis allows the researcher to determine the relationship between tuition increases and other key indicators of financial performance among

colleges. This chapter also discussed the source of the data, hypotheses, a brief description of the sample, and information on data analyses and the variables used for study. The principal method used in this study is the fixed effects model. Together these data and variables provide a greater variety of financial information that may be used to determine and predict both colleges' tuition-setting behavior and their ability to remain open amidst economic pressures.

Chapter 4

Results

This chapter includes a review of the study's research questions, presentations of demographic and descriptive statistics, trends in financial variables, and the results of the panel data analysis. Further discussion and interpretation of the results can be found in Chapter 5.

Research Questions

The following questions were examined in this research.

Primary Research Question:

1. Is financial condition associated with the annual percentage change in tuition at private nonprofit baccalaureate colleges?

Secondary Research Questions:

2. Are annual operating results associated with the annual percentage change in tuition?
3. Are liquidity and flexibility associated with the annual percentage change in tuition?
4. Is leverage associated with the annual percentage change in tuition?
5. Is asset performance associated with the annual percentage change in tuition?
6. Is the tuition discount associated with the annual percentage change in tuition?

Descriptive Statistics

Summaries of the descriptive statistics for all variables can be found in Appendices A (all variables), B (finance variables by Barron's selectivity category), and C (finance variables by region). The following presentation concentrates on unusual or interesting patterns in the data.

Demographic Data

This study used data from 452 U.S. colleges and universities with the Carnegie classifications *Baccalaureate - Arts and Sciences* and *Baccalaureate – Diverse Fields*. Average full-time equivalent (FTE) enrollment for this cohort increased from 1350 FTEs in 1998 to 1548 FTEs in 2008. The mean and median number of fulltime faculty in 2008 were 136 and 112 respectively. Approximately 34 percent of these institutions maintain a religious affiliation but the strength of that affiliation is impossible to determine from the IPEDS survey data. The median total revenues and investment return grew from $19.7 million in 1998 to nearly$28 million in 2008. Total expenses increased at a greater rate with a median of $15.6 million in 1998 and $28.3 million in 2008. There are considerable wealth differences among the institutions in this cohort. In 2002, the first year endowment information was available in IPEDS, the median and mean endowment values were $16.8 million and $72.9 million, respectively. By 2008, the median endowment value grew to nearly $27 million and the mean endowment value grew to $119.6 million. See Appendix D for supplemental demographic data. Table 4-1 is a summary of *Barron's Profiles of American Colleges* selectivity ratings for the 452 institutions from 1998 through 2007. *Barron's* did not publish annually during the period of this study. From 1999 forward, issues were published every other year. On average, colleges in this cohort became more selective throughout the period.

Table 4-1 Barron's Selectivity rankings, number of institutions and average score, 1998 through 2007.

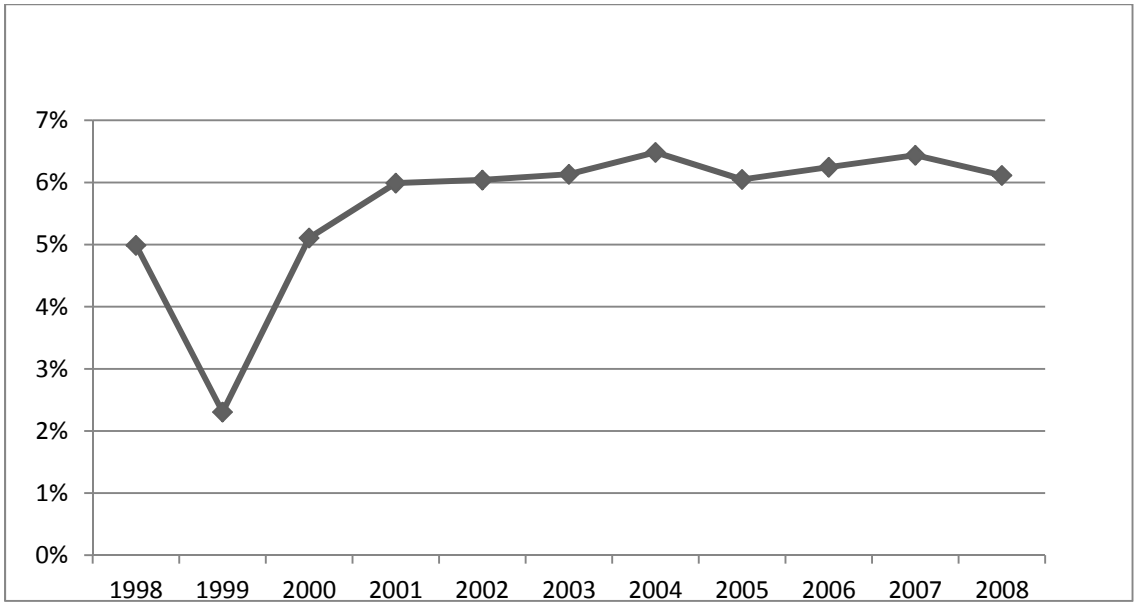
Barron's Category	1998	1999	2001	2003	2005	2007
Non-competitive	21	21	24	14	14	19
Less competitive	75	73	96	74	57	55
Competitive	158	148	126	150	157	175
Very competitive	91	95	88	93	97	89
Highly competitive	34	42	42	45	46	43
Most competitive	19	19	21	21	26	33
Unranked	54	54	55	55	55	38
Average Selectivity Score*	**2.8**	**2.9**	**2.8**	**3.0**	**3.0**	**3.1**

*Note: Integer rankings follow: *Non-competitive* = 1, *less competitive* = 2, *competitive*=3, *very competitive*=4, *highly competitive* = 5, *most competitive*=6, unranked=o.

Tuition Change

The annual change in tuition was measured as Tuition Change (TC) in the model. TC is computed as the total of current year's gross tuition minus the previous year's gross tuition divided by the previous year's tuition. The mean TC was 5.6 percent throughout the period. Figure 4-1 illustrates the trend in overall TC from 1998 through 2008. The TC trend line meets its lowest point in 1999 and its peak in 2004. Although not included in this study's analysis, the mean TC in 2009 dropped to 4.2 percent. TC in the South region averaged the highest of all regions at 6 percent during the period. Unranked and noncompetitive (NON) institutions increased tuition at higher rates than those with better selectivity rankings.

Figure 4-1 Mean Tuition Change, 1998-2008



Operating Results

Two variables used in this study measured operating results, the Net Operating Revenues (NOR) and Tuition Dependency (DEP) ratios. The NOR is the total change in net assets divided by total revenues. DEP is total net tuition revenue divided by total revenues. A high degree of volatility was present in both NOR and DEP due to the inclusion of investment gains and losses (IGL) in total revenues. As Townsley (2009 and 2002) illustrated, the presence of IGL (including unrealized investment gains and losses) can hinder accurate analysis of the operating results. See Figure 4-2 for information on mean IGL from 1998 through 2008. Figures 4-3 and 4-4 illustrate the difference between both NOR and DEP and the same ratios minus IGL.

Figure 4-2 Investment Gains and Losses

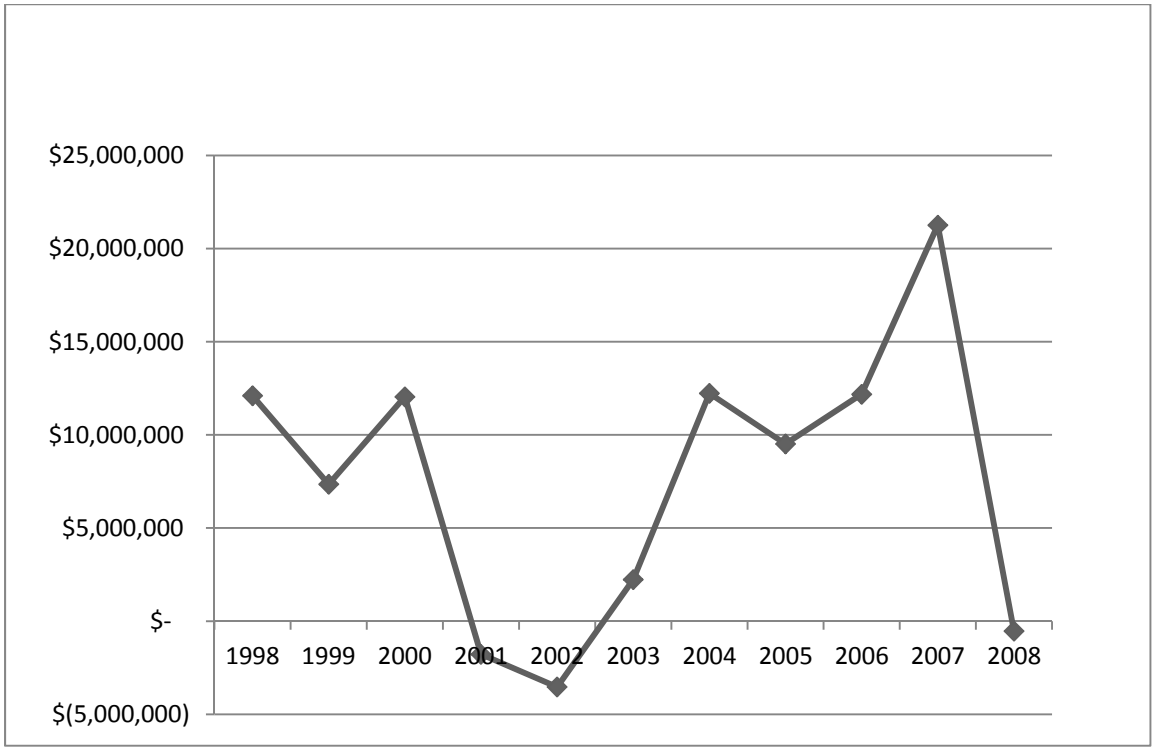
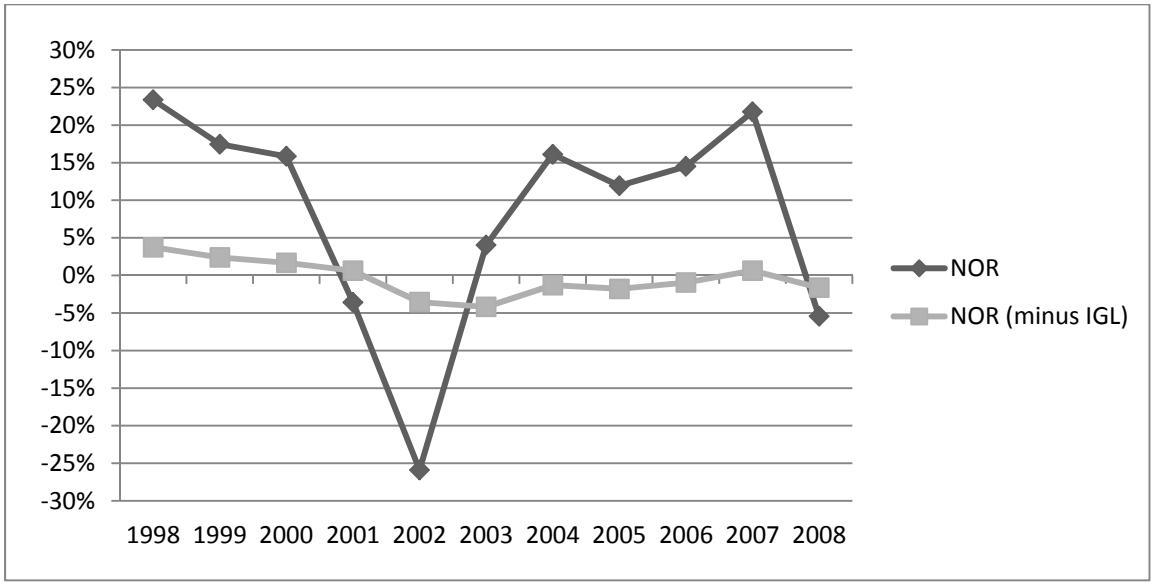


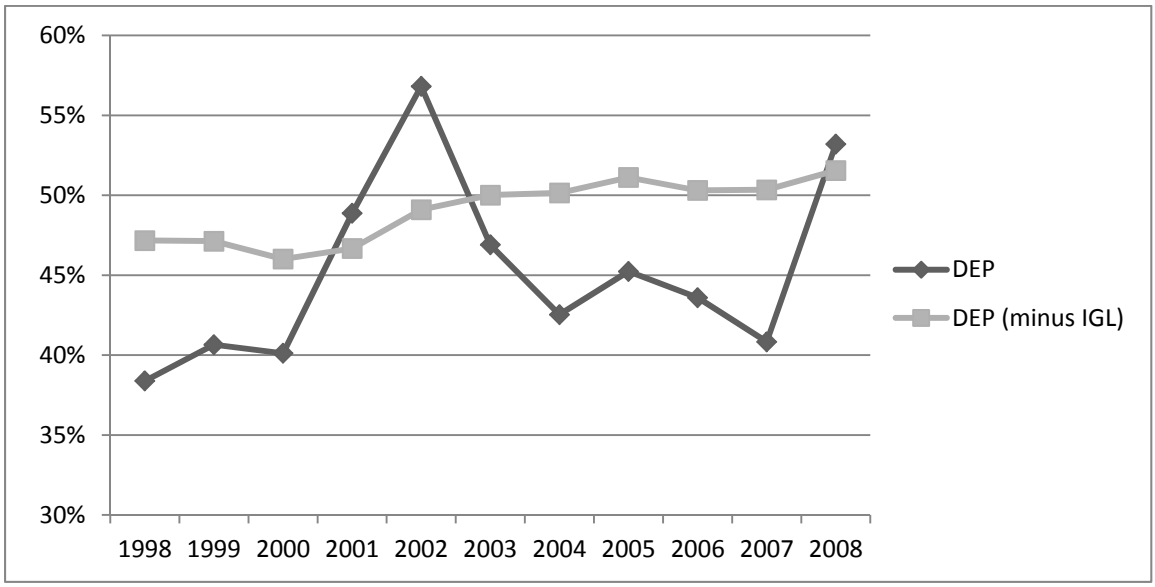
Figure 4-3 Net Operating Revenues ratio, 1998 through 2008



The NOR trend follows a volatile trajectory with a steep decline from 2000 to 2002 and a steep increase between 2002 and 2004. The NOR rebounds until 2008 when it drops

precipitously. The trend line for NOR (minus IGL) is much flatter than the NOR. The trend is a gradual decline from 1998 through 2003 and remains mostly level (but negative) until 2008. Overall, the NOR minus IGL results indicate the average private baccalaureate nonprofit college rarely does better than break-even.

Figure 4-4 Tuition Dependency, 1998 through 2008

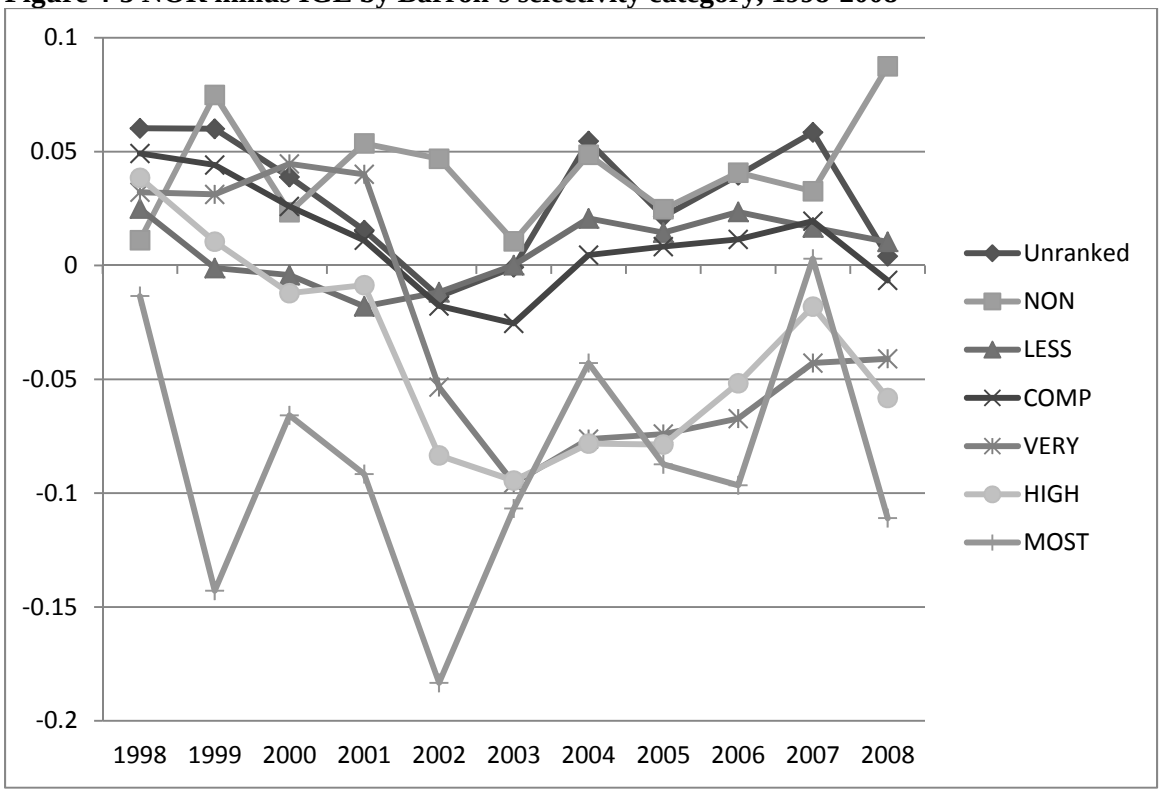


Like the trend for NOR minus IGL, the trend for DEP minus IGL is much less volatile than the trend for DEP. The peaks in DEP occur in the same years as the troughs in NOR. Generally, the DEP minus IGL increases slowly over the period indicating a growing dependence on tuition revenue..

The NOR values for very selective, highly selective, and most selective institutions exceeded the NOR values in the remaining selectivity categories in 1998 through 2000 and again from 2004 through 2007. The very, highly, and most selective institutions trailed all remaining groups in 2002. When considering NOR minus IGL, the very, highly and most selective institutions trailed all other types of institutions in nearly every year with negative results in nearly every year (see Figure 4-5). The highest mean NOR occurred in the Northeast at just over

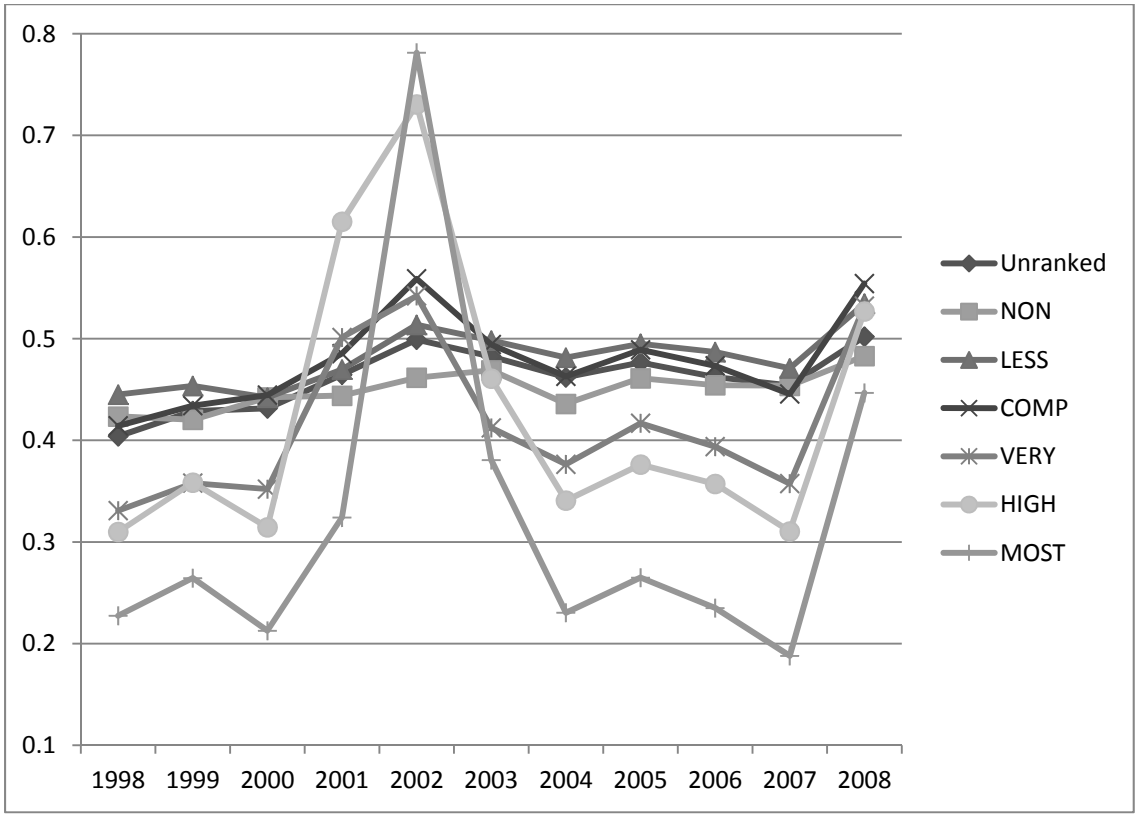
12 percent for the period. The lowest NOR was in the South at 9.3 percent. The range for NOR minus IGL was a nearly negative one percent in the South to approximately 3 percent in the West.

Figure 4-5 NOR minus IGL by Barron's selectivity category, 1998-2008



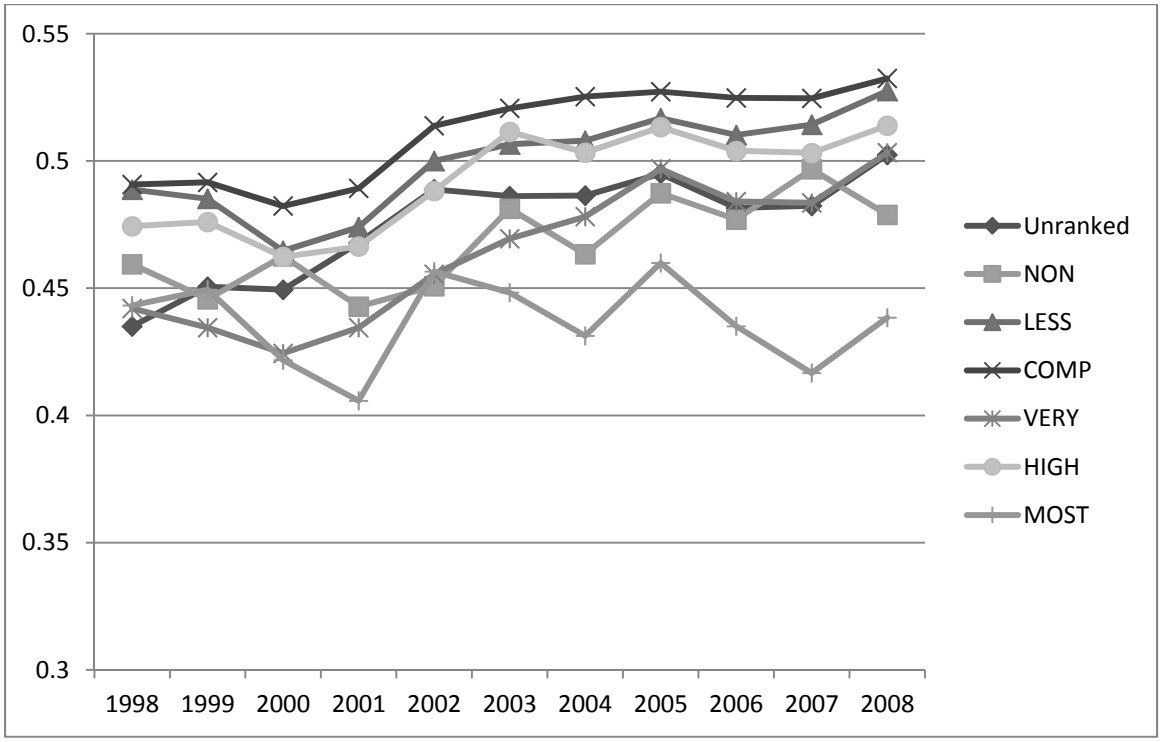
Very, most and highly selective institutions had lower mean DEP values than institutions in other selectivity categories in nearly all years except 2002. See Figure 4-6.

Figure 4-6 DEP by Barron's selectivity category, 1998-2008



When subtracting IGL from DEP, the competitive cohort of colleges exhibits the highest tuition dependency throughout the entire period. Most selective institutions are the least tuition dependent in nearly every year. See Figure 4-7.

Figure 4-6 DEP minus IGL by Barron's selectivity category, 1998-2008

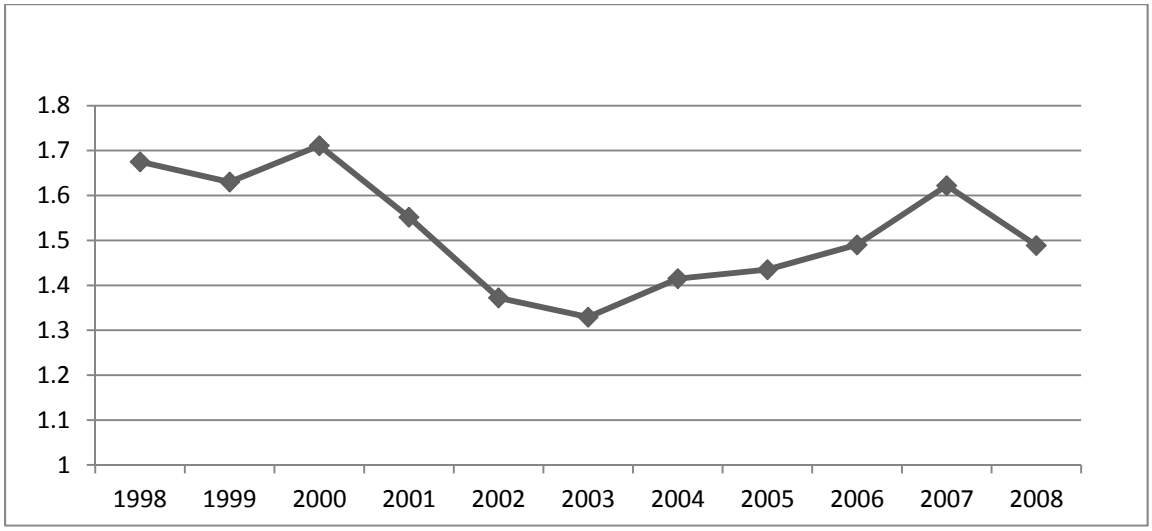


The regional DEP means range from 44.4 percent in the South to nearly 53 percent in the Northeast. The scores for DEP minus IGL were higher and ranged from 48.6 percent in the South to 58.8 percent in the Northeast.

Liquidity and Flexibility

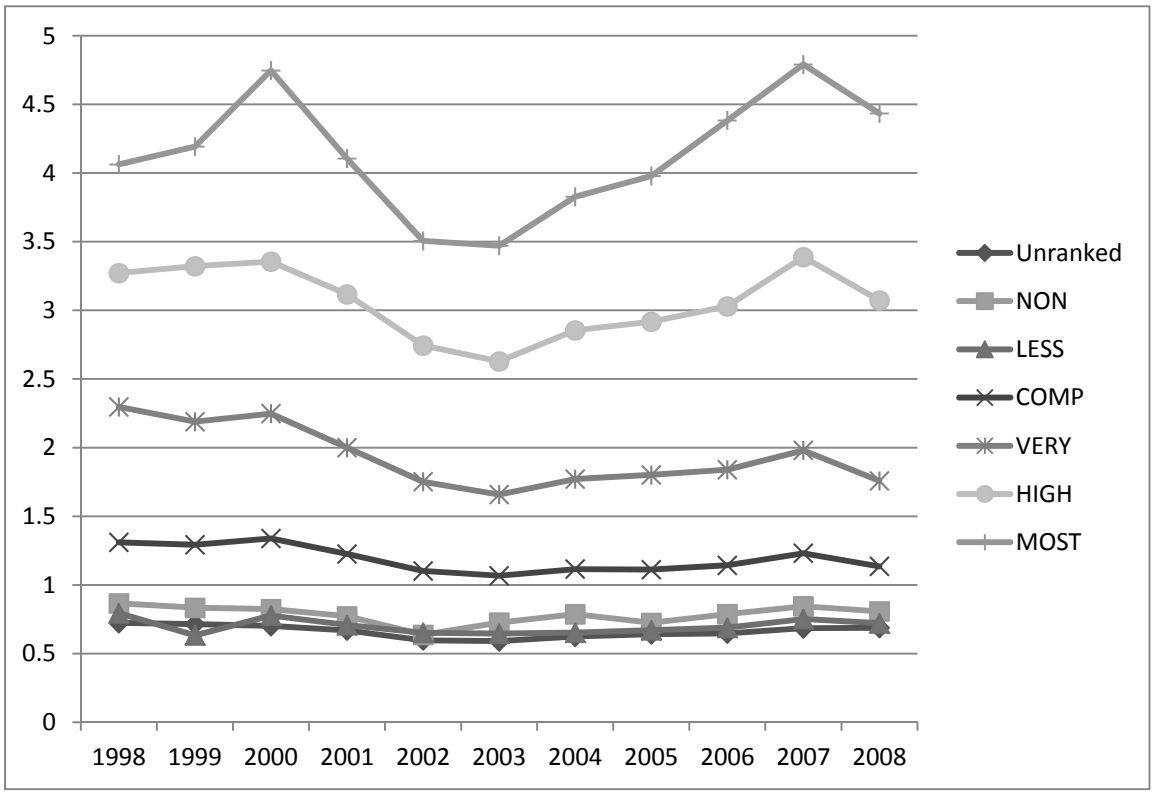
The Reserve ratio (RES) is this study's proxy for liquidity and flexibility. RES is computed by dividing unrestricted net assets by total expenses. The RES trend was relatively flat with a slight downward slope during the period (see Figure 4-8). Regional differences in RES range from 2.28 in the West to 1.4 in the South. The most striking pattern in RES appears when examining selectivity differences (see Figure 4-9).

Figure 4-8 Reserve ratio, 1998 through 2008



The selectivity hierarchy is very distinct when examining the RES. Most selective institutions have much higher RES scores than the group with the next highest RES, highly selective. The hierarchy is very clear until evaluating the scores of unranked, non-selective, and less selective institutions who tended to have comparable RES values during the period.

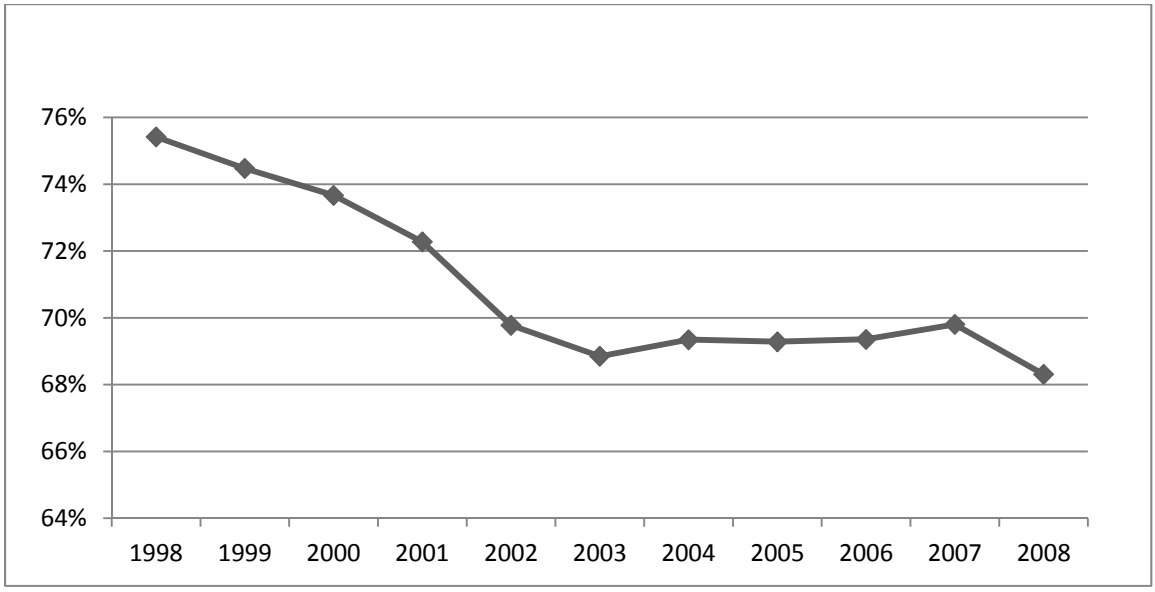
Figure 4-9 Reserve ratio by Barron's selectivity category, 1998 through 2008



Leverage

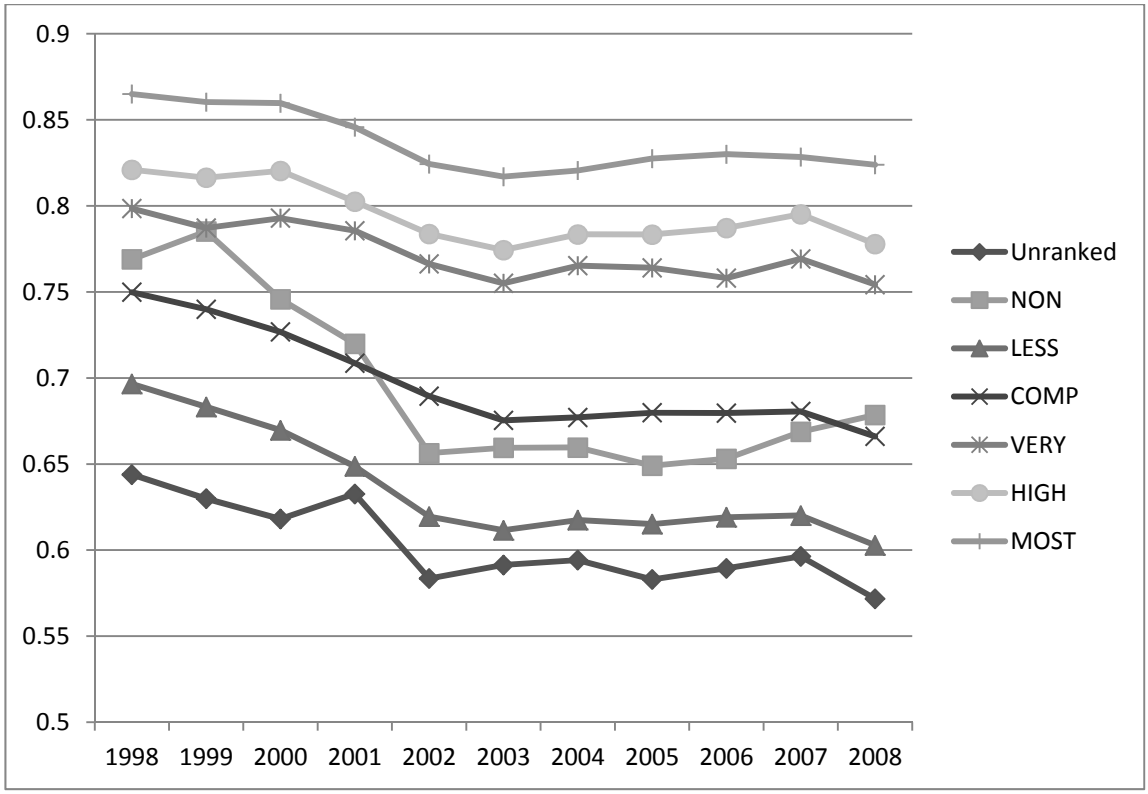
The Capitalization ratio (CAP) serves as the measure of leverage. The CAP is the result of dividing total net assets by total assets. A decreasing score indicates an institution is increasing its amount of total liabilities (debt) at a faster rate than increasing total assets. The overall CAP mean declines from roughly 75 percent in 1998 to nearly 68 percent in 2008 (see Figure 4-10). Regionally, CAP means range from 74 percent in both the Northeast and West to 80 percent in the South.

Figure 4-10 Capitalization ratio, 1998 through 2008



Like the trend in RES, the CAP trend, when categorized by Barron's selectivity measures, indicates a clear hierarchy. Most selective institutions have the least amount of debt and the highest CAP scores and unranked institutions with the lowest CAP scores. The trend for all categories is downward and there is virtually no intersection of trend lines except for non-competitive colleges rapid decrease in CAP from 1999 to 2002 (see Figure 4-11).

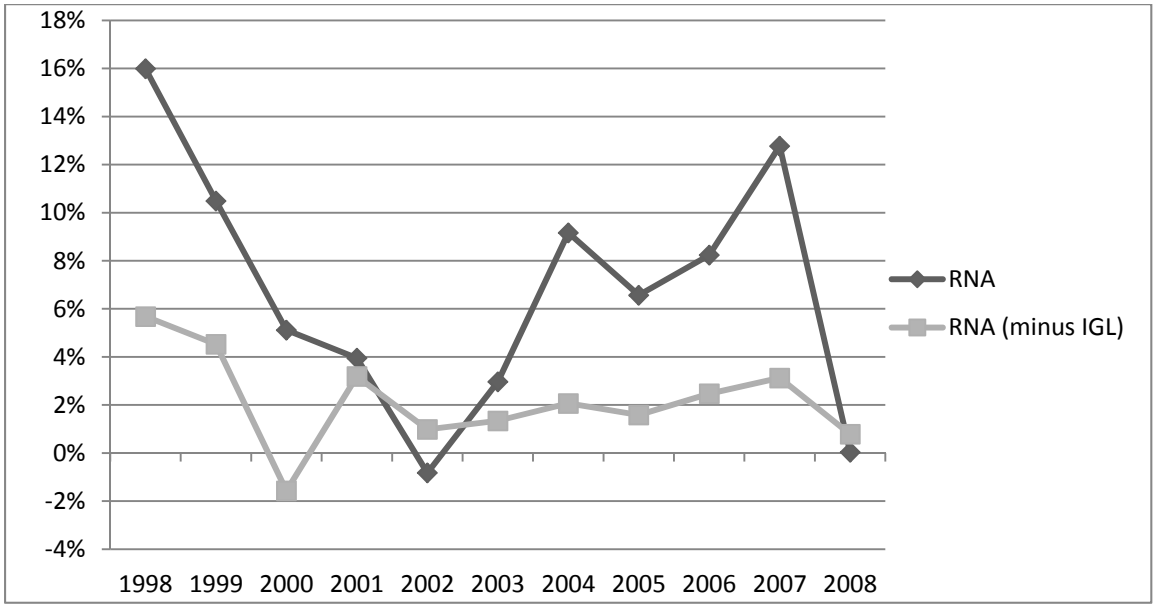
Figure 4-11 Capitalization ratio by Barron's selectivity category, 1998-2008



Asset Performance

Asset performance is measured using the Return on Net Assets ratio (RNA). RNA is the result of dividing the change in net assets by the total net assets from the prior year. Since the RNA includes IGL, the researcher also computed RNA minus IGL. Figure 4-12 compares the RNA and RNA minus IGL. The RNA is, for most of the years, higher than the RNA minus IGL. RNA peaks in 1998 and begins a steep decline until 2002. RNA rebounds until 2007 and then approaches zero in 2008. Generally, RNA minus IGL is less volatile and declines throughout the period with its steepest troughs in 2002 and 2008.

Figure 4-12 Return on Net Assets, 1998 through 2008



When categorized by selectivity, RNA and RNA minus IGL indicate little difference between categories (excepting more volatility in both unranked and non-competitive institutions) and all categories are consistent with the pattern of overall the overall means. Regionally, the RNA ranges from 7 percent in the Midwest to 10.4 percent in the West. The RNA minus IGL ranges from 2.2 percent in the Midwest to nearly 5 percent in the West.

Tuition Discount

Tuition Discount (TD) is the amount of total institutional aid divided by gross tuition. Overall TD increased slowly and steadily from 28 percent in 1998 to nearly 34 percent in 2008. See Figure 4-13.

Figure 4-13 Tuition Discount, 1998 through 2008

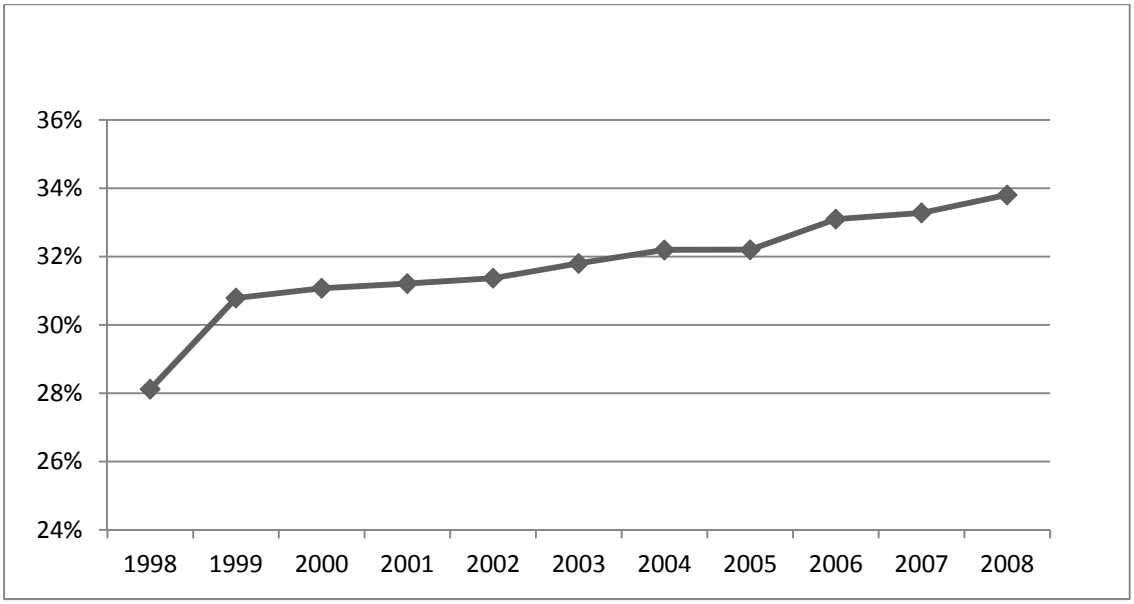
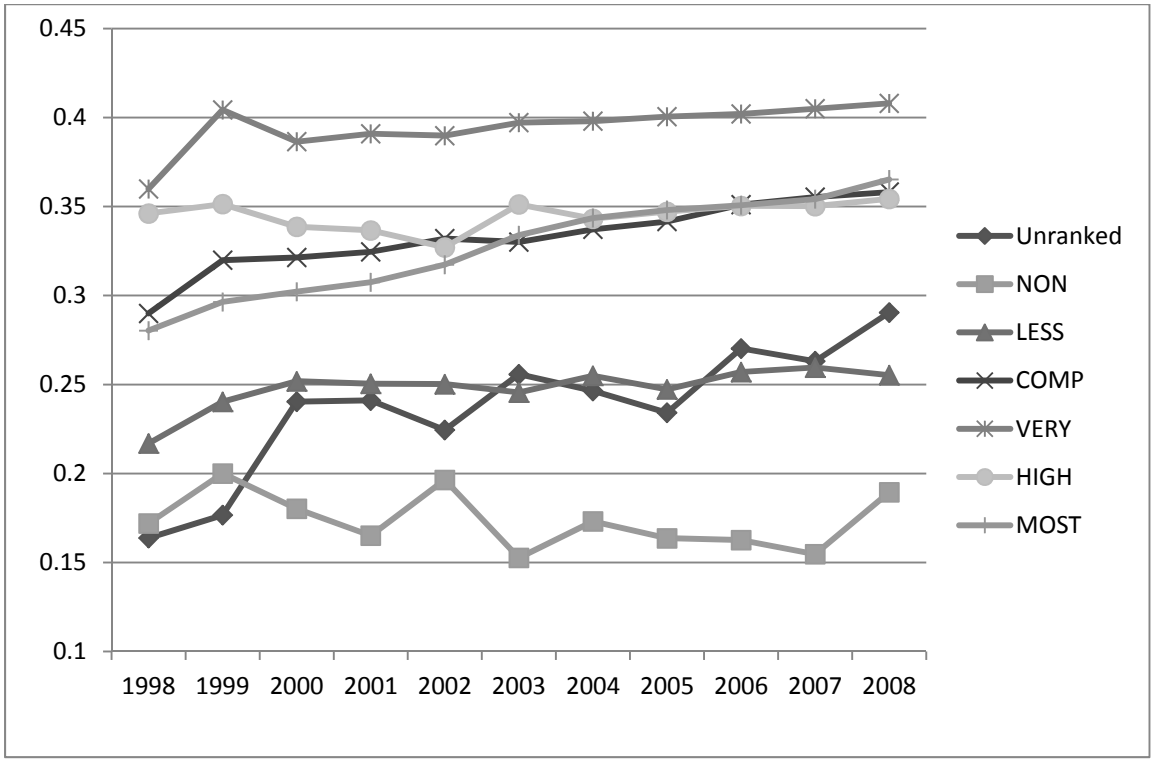


Figure 4-14 illustrates selectivity differences for TD. Very competitive institutions, those in the middle of the prestige hierarchy, had the highest TD in each year and increased from 36 to 41 percent during the period. Competitive, highly competitive, and most competitive colleges and universities were clustered near the overall mean. However, highly competitive institutions experienced a more gradual or flatter increase in the TD than did competitive or most competitive institutions. Non-competitive institutions had the lowest TD during the period with a relatively flat trend. Regionally, the trends for all four regions followed the same gradual increase. Regional means for the period ranged from 31.5 percent in both the West and South to 38.4 percent in the Midwest.

Figure 4-14 Tuition Discount by Barron's selectivity category, 1998-2008



Panel Data Analysis

With a cross-section of 452 institutions and a time series of eleven years, panel data or pooled cross-sectional time series analysis is the appropriate method of analysis. The panel of 452 is strongly balanced with all institutions providing all data for each of eleven years. It is important to note that this study includes the population, not a sample, of private nonprofit baccalaureate colleges in the U.S. and when the researcher refers to statistical significance it is in keeping…

First, the pooled regression model was specified to allow for multicollinearity testing. To test for multicollinearity, variance inflation factors (VIF) and tolerances were calculated (see Appendix E). Two independent variables exceeded the 2.5 VIF threshold. COMP and VERY had VIF (tolerance) of 2.81 (0.356358) and 2.58 (0.388342), respectively. The scores suggest

that multicollinearity is present but not at levels likely to bias the estimated coefficients materially. A pairwise correlation table (see Appendix F) indicated a moderate (.63) correlation between the two operating results variables, NOR and DEP, a correlation unlikely to affect the results. Nevertheless, the researcher prepared the pooled regression model without the COMP variables and again without the VERY variable (see Appendix G). The researcher also prepared a full fixed effects model and compared it to the model minus NOR then the model minus DEP (see Appendix H). In both cases, the results of the reduced models were similar to those of the full models and to one another. Therefore, the researcher made the decision to keep all variables when analyzing both the fixed effects and random effects models.

Table 4-2 provide the results of panel data analysis for the fixed effects and random effects models for the primary model using a 3:1 weighting scheme for the financial variables. Four-hundred fifty-two institutions were part of the panel data analysis which included 11 years for a total of 4,972 observations. As a means of sensitivity analysis, the researcher analyzed the same models using a 1:1 weighting scheme for the finance variables. The results for the 1:1 weighted model were similar to the primary model and can be found in Appendix J.

Table 4-2 Regression results for the 3:1 Weighted Model

Variable	**Fixed Effects Model**	Random Effects Model	Fixed Effects Model using cluster-robust standard errors	Random Effects Model using cluster-robust standard errors
NOR	**-.0053538 (-1.78)**	-.0031307 (-1.38)	-.005358 (-0.98)	-.0031307 (-0.60)
DEP	**.0006711 (0.08)**	.0067014 (1.19)	.0006711 (0.08)	.0067014 (1.00)
RES	**-.0036017 (-2.00)***	.0009749 (1.75)	-.0036017 (-2.01)*	.0009749 (2.340)*
CAP	**-.0282097 (-2.57)****	-.009947 (-1.97)*	-.0282097 (-2.24)*	-.009947 (-2.01)*
RNA	**-.0099584 (-2.81)****	-.010118 (-3.08)**	-.0099584 (-2.40)*	-.010118 (-2.42)*
TD	**-.0158447 (-1.55)**	-.013538 (-2.46)*	-.0158447 (-1.20)	-.013538 (-1.84)
PCI	**-.087847 (-1.19)**	-.1162192 (-2.67)**	-.087847 (-1.76)	-.1162192 (-2.48)*
NON	**-.0023713 (-0.22)**	-.0073356 (-1.74)	-.0023713 (-0.24)	-.0073356 (-1.36)
LESS	**.0004537 (0.05)**	-.0080054 (-2.81)**	.0004537 (0.08)	-.0080054 (-2.61)**
COMP	**.0046803 (0.48)**	-.0030864 (-1.20)	.0046803 (0.98)	-.0030864 (-1.15)
VERY	**.0058874 (0.58)**	-.0025372 (-0.88)	.0058874 (0.96)	-.0025372 (-0.91)
HIGH	**.00739 (0.64)**	-.0034197 (-0.97)	.00739 (1.12)	-.0034197 (-1.19)
MOST	**.02008 (1.34)**	-.0018639 (-0.42)	.02008 (2.53)*	-.0018639 (-0.45)
NE	**(omitted)**	-.0072417 (-3.38)**	(omitted)	-.0072417 (-3.62)**
MW	**(omitted)**	-.0068463 (-3.64)**	(omitted)	-.0098463 (-3.80)**
WEST	**(omitted)**	-.0064519 (-2.14)**	(omitted)	-.0064519 (-2.40)*
Intercept	**.0871243 (6.70)**	.0771777 (13.71)	.0871243 (7.56)	.0771777 (13.86)
R-squared	**0.0906**	0.0151	0.0906	0.0151

Notes: A Hausman test indicated the fixed effects model as the appropriate model for this study. Other models are listed for informational purposes. Also, t and Z values are listed in parentheses below the variable coefficients. *p<.05, **p<.01.

The fixed effects model does not include the regional dummy variables because they are time-invariant and not necessary. Fixed effects models consider only those variables that change over time. The resulting R-squared for the fixed effects model is 0.0906. Three variables are significant at a p-level of 0.05 or less. They are RES, CAP, and RNA. Panel data often encounter heteroskedasticity but using cluster-robust standard errors helps control for this problem. Regression analysis assumes errors are independent and identically distributed. In the

presence of heteroskedasticity, the model may produce the wrong standards errors and inferences may be flawed but "clustering on the panel variable produces an estimator of the variance component estimation (VCE) that is robust to cross-sectional heteroskedasticity and within-panel (serial) correlation" (StataCorp, 2005, pg. 293; Wooldridge, 2002). The results of both regression models using robust standards errors are also found in Table 4-2. In the fixed effects model, the same three variables (RES, CAP, and RNA) remain statistically significant using robust standard errors and MOST is now significant.

The random effects model includes regional dummy variables and resulted in an R-squared of 0.0151 (see Table 4-2). The following variables are statistically significant at the 0.05 level or better; CAP, RNA, TD, PCI, LESS, NE, MW, WEST. Many of the same variables remain significant at the 0.05 level using robust standard errors. However, TD is no longer significant using robust standard errors and RES is significant.

A Hausman test comparing the fixed and random effects models results in a score of 0.0308 indicating the fixed effects model is the appropriate choice for the analysis.

Because of the volatility involved in using IGL in the computation of financial ratio variables, the researcher subtracted IGL from the affected ratios (NOR, DEP, and RNA) and applied identical analytical procedures on a separate model with the IGL adjusted variables. The Hausman results again confirmed the use of the fixed effects model. In the case of the IGL-adjusted fixed effects model, the R-squared was slightly lower at 0.088, the coefficients of independent variables were similar to those in the original model, and RES, CAP, RNA minus IGL and PCI were significant at the 0.05 p-level or better, similar to the original model. However, when using robust standard errors, RNA minus IGL was no longer significant and MOST was now significant. See Appendix I for more detail on the IGL-adjusted models using the 3:1 weighting scheme for financial variables.

The assumption underlying the original model was that the tuition-setting decision occurs roughly four months into year two when year one's financial statements are complete and four months of year two data are available. Of the sixteen most recent months of financial data available, twelve were summarized during year one and roughly four months of year two data are known within the institution but are not yet publicly-reported. Hence the 3:1 weighting scheme for the original model. As a means of sensitivity analysis, the same model was constructed for financial variables weighted using a 1:1 scheme. The researcher applied identical analytical procedures on the 1:1 model. The Hausman results again confirmed the use of the fixed effects model. In the case of the 1:1 fixed effects model, the R-squared was 0.0914, the coefficients of independent variables were similar to those in the original model, and RES, CAP, RNA, and TD were statistically significant. TD was not significant in the 3:1 weighted model. Additionally, the coefficients for both CAP and TD were considerably larger in the 1:1 model than in the 3:1 model. However, when using robust standard errors, TD was no longer significant (p-value = 0.067) and the MOST variable was significant at the 0.05 level. See Appendix J for more detail on the 1:1 weighted models.

Using the fixed effects model from Table 4-2 as the basis for discussion, the research questions are addressed.

First, *Is financial condition associated with the annual percentage change in tuition at private nonprofit baccalaureate colleges?* With an R-squared of 0.0906, the association indicated is relatively weak as the model accounts for roughly nine percent of the variability in the annual percentage tuition change. With that caution, the remaining questions are addressed.

Second, *Are annual operating results associated with the annual percentage change in tuition?* The results of Table 4-2 indicate no statistically significant relationship between the operating results proxies used in this study (NOR and DEP) and annual percentage tuition

change. This null result was true of all models, including the random effects models, the models without investment gains and losses (IGL) and models with the 1:1 weighting scheme.

Next, *Are liquidity and flexibility associated with the annual percentage change in tuition?* The variable representing liquidity and flexibility was RES. The limitations of this variable were discussed in detail in Chapter 3. However, the RES, controlling for all other variables, possesses a statistically significant association with TC. With a coefficient of -0.0036 (or -0.36 percent) it explains little of the annual percentage change in tuition. The interpretation of the coefficient is best illustrated using a hypothetical example. Assume the fictitious Alpha College has a RES score slightly above average at 1.5 and it falls to 1.0 over time. All other variables being equal, Alpha's expected annual increase in tuition would be approximately 0.18 percent greater than it would have been if the RES had remained stable at 1.5..

Is leverage associated with the annual percentage change in tuition? Leverage measures the use of debt. The measure used to proxy for leverage is CAP. As discussed in Chapter 3, there is very little data publicly available on the use of debt in higher education institutions. CAP was statistically significant at the 0.01 p-level and possessed the largest coefficient of any financial variable in the study, -0.028 (or -2.8 percent). To interpret this result, consider the following fictional example: over time Alpha College's CAP falls from 0.85 to 0.50 and all other variables remain equal. As a result, Alpha's expected annual tuition increase is nearly one percent greater because of the decline in CAP (ex. now six percent versus previous five percent).

Is asset performance associated with the annual percentage change in tuition? Asset performance was measured using RNA in the original fixed effects model (Table 4-2) and was significant at the 0.01 p-level with a coefficient of 0.0099 (or 0.99 percent). RNA was one of three variables adjusted for IGL (NOR and DEP were the others) and used in analysis of a revised model (see Appendix I). RNA minus IGL was significant at the 0.05 p-level with a coefficient of

0.0082 (0.82 percent). However, RNA minus IGL was not significant when using robust standard errors.

Is the tuition discount associated with the annual percentage change in tuition? With a p-value of 0.12, the TD was not significantly associated with TC in the fixed effects models using the 3:1 weighting scheme, the model indicated by the Hausman test. However, TD was statistically significant in both the fixed and random effects models using the 1:1 weighting scheme with coefficients ranging from 0.015 to 0.028 (see Appendix J).

Chapter Five includes a discussion of the trends and panel data analysis presented in this chapter.

Chapter 5

Discussion

Introduction

The ultimate aim of this research was to develop a better understanding of the institutional financial factors associated with the high rate of growth in tuition. High tuition is common at small private nonprofit colleges and universities and these same institutions seem to routinely encounter financial distress. Small private nonprofit colleges are an important alternative for many students but many of these institutions suffer from both unattractive high tuition and limited financial wherewithal. What follows is a discussion and interpretation of this study's findings, limitations in the current study, implications and recommendations for higher education leaders, and possibilities for future research.

Findings

The following section includes a discussion of the results of the panel data analysis and accompanying discussion of noteworthy trends and descriptive data.

Primary Research Question: Is financial condition associated with the annual percentage change in tuition at private nonprofit baccalaureate colleges?

The panel data model analyzed in this study sought to investigate the annual percentage tuition change (TC) using financial variables representing overall financial condition as explanatory variables. The model resulted in an R-squared of 0.0906 (see Table 4-2). R-squared

estimates for panel data analysis are generally much lower than the R-squared estimates found using only cross-sectional data. Despite the *a priori* expectation that financial condition is associated with tuition-setting, the association indicated in this study is relatively weak as the model accounts for only nine percent of the variability in the annual percentage tuition change.

One possible explanation for the weak association (see others in the *Limitations* section) is found in examining the trend for the dependent variable, TC. When there is little variability in the dependent variable, it is difficult to find statistically significant and sizable results. The TC mean was relatively flat during the period despite a sizable amount of variability across institutions. The standard deviation ranged from 3.2 to 7.4 percent from 1998 through 2008. The period mean TC for the institutions in this study equals 5.6 percent, identical to the 10-year mean found in the College Board's *Trends in College Pricing* report (2008). The College Board (2008) report includes data on both private and public institutions. This study's TC low point in 1999 (mean equals 2.3 percent) corresponds with a similar trend in the College Board (2008) report. The low point in TC may be the result of public pressure on colleges to limit the growth of tuition particularly near the end of a prosperous decade during which college endowments grew. Despite the absence of a statistically significant relationship between TC and the categorical quality variables, the data produces some interesting observations.

The absence of a statistically significant association between TC and quality (as measured using Barron's selectivity rankings) when controlling for all other variables runs counter to previous research. The data in Appendix B indicate the unranked and non-competitive institutions increased tuition at rates greater than the remainder selectivity categories. Conversely, Hoxby (1997), in her study of 1121 colleges (731 were private) from 1940 through 1991, found that higher prestige colleges raised tuition at a greater rate than lower quality colleges. There are three possible reasons her finding does not hold true for the cohort examined in this study. One, the cohort is not representative of most colleges and universities. Two, tuition, measured in

absolute dollars, at higher prestige colleges has reached a peak beyond which popular sentiment becomes negative so tuition increases have remained low. Three, less prestigious colleges are raising tuition at a greater rate in order to close the gap on sticker price tuition in an effort to 1) signal higher quality (i.e. a prestige pricing strategy) and/or 2) generate additional tuition revenue to support various amenities to attract more students (assuming the tuition discount is either decreasing or increasing at a slower rate than tuition). On the other hand, Yanikoski's (1989) comparison of the tuition-setting process for high and low quality colleges conforms with the data in this study, "institutions at each rung of the educational pecking order take comfort in the fact that those above them are raising prices at a rate that in absolute terms makes their own increases seem modest. Thus, when a $6,000/year institution considers a ten percent increase amounting to $600, it feels comparatively safe in the knowledge that a lower increase of eight percent at the $8,000/year institution will amount to more" (pg. 92).

The move toward a prestige pricing strategy may affect regions also. Dimkpah et al., (2004) found colleges in the South and Midwest have significantly lower tuitions than colleges in the Northeast when tuition is measured in dollars. The data in this study indicated colleges in the South raised tuition at an average annual rate of 6 percent, the highest of all regions. The data may suggest colleges in the South are trying to raise gross tuition to comparable levels with colleges in other regions, particularly the Northeast, home to many high prestige institutions.

Given the relatively low explanatory power of the overall model, one should read the following discussion of the remaining research questions with professional skepticism, exercising caution when drawing conclusions.

Research Question #2: Are annual operating results associated with the annual percentage change in tuition?

Two variables were used to represent annual operating results, the Net Operating Revenues (NOR) and the Tuition Dependency (DEP) ratios. The results of Table 4-2 do not indicate statistically significant relationships between either NOR or DEP and tuition change when controlling for all other variables. This result was true of all models, including the random effects models, the models without investment gains and losses (IGL) and models using the 1:1 weighting scheme (See Table 4-2 and Appendices F and G). The absence of a statistically significant association between these operating measures and tuition seems to run counter to existing research. Brown (1994) found an annual surplus (deficit) is associated with tuition rate. The NOR measures surplus (deficit) as a percentage of total revenues. Additionally, Cunningham and Merisotis (2002) found instructional expenditures, faculty compensation, and gift income, all operating items, were associated with tuition. Paulsen (1991) found institutional expenditures, also an operating item, were associated with tuition. Koshal and Koshal (1999) found educational costs were positively associated with tuition. There are three likely reasons for the difference in result. First, this study measures the dependent variable as percentage change in tuition while the studies discussed above measure tuition in dollars. Also, previous tuition model research included only those items classified as operating items in the accounting records without controlling for liquidity, leverage (debt), and asset performance. The present study controls for those elements. Finally, this study measures all financial variables as ratios not in dollars as in some previous research.

Despite the absence of a statistically significant relationship between TC and either NOR or DEP, the data reveal some noteworthy patterns. The NOR was very volatile during the period and the troughs in the trend line (see Figure 4-3) roughly correspond with low points in the Dow Jones Industrial Average (DJIA). The NOR includes investment gains and losses (IGL), both

realized and unrealized, in its computation. When subtracting IGL from NOR, one is left with a much smoother trend line (see Figure 4-3).

The volatility of NOR brings into question its usefulness as a measure of annual operations. The NOR is nearly identical to the profit margin ratio used to evaluate for-profit organizations. One would expect organizations with a negative NOR (i.e. a deficit) equal to 25.9 percent (the 2002 mean for all 452 institutions), to suffer catastrophic consequences. None of the 452 institutions were forced to close by 2008. In a for-profit environment, the same outcome is very unlikely as a one year deficit of that size is likely to result in serious financial turmoil. Because the NOR is dependent upon factors beyond organizational control, it is not especially indicative of actual college or university operations and, as a result, not particularly useful for analysis and decision-making. The NOR (minus IGL) may be more indicative of operations because excluding investment gains and losses minimizes risk and allows for predictability and control (Townsley, 2009).

The data on the period means (See Appendix A) for both NOR and NOR minus IGL best illustrate the point. Only sixty institutions had a period deficit (i.e. NOR less than 0.00). When NOR minus IGL is examined, 185 institutions have period deficits. The institutions most likely to have a deficit (measured as NOR minus IGL) were those in the very, highly and most competitive categories, in which 46 percent, 54 percent, and 76 percent, respectively, of the total number of institutions in each of those categories had a period deficit.

The data also indicate institutions in the very, highly, and most selective Barron's categories had higher NOR from 1998 through 2000 and again from 2004 through 2007. These three groups trailed the remaining groups in 2002. The data suggest institutions in the more prestigious half of the selectivity hierarchy may be more dependent on IGL than institutions in the bottom half. When examining NOR minus IGL, very, highly, and most selective institutions trailed those in the less prestigious half of the hierarchy in every year of the study. This finding

suggests wealthier institutions (i.e. those assumed to hold larger endowments) are more tolerant of poor annual operating results (low NOR minus IGL) because they have greater reserves. Future research on the relationships between NOR, size of endowment (institutional wealth), and IGL may reveal more about this pattern.

The trend in DEP (see Figure 4-4) illustrates colleges are more tuition dependent when the DJIA and IGL are down. The DEP minus IGL trend line is less volatile and indicates the institutions in this cohort became more tuition dependent over the period – tuition as a percentage of total revenues grew from 47 to nearly 52 percent. Competitive institutions were the most tuition dependent and most competitive the least dependent. This difference stands to reason because the most competitive colleges often have more prestige and therefore better ability to attract non-tuition sources of revenue. Institutions in the South were the least tuition dependent and those in the Northeast were most tuition dependent. Like the NOR, the DEP ratio appears to be a poor measure of annual operations. DEP minus IGL eliminates the volatility of the stock market over which the institution does not exercise control and provides a more realistic measure of tuition dependency.

The negative trend in DEP minus IGL is a concern for many of the colleges in the study but the problem of total student revenue dependence might be even more severe. Because many private baccalaureate colleges are also largely residential, they are even more dependent on student revenues (tuition plus room and board plus fees). Although this study did not collect data on the number or percentage of students living on campus nor room and board revenue, it is an area for future research in determining more accurate measures of dependence on total student revenues.

The higher education accounting and finance practitioner literature identifies tuition dependent colleges as those with DEP greater than sixty percent (Townsley, 2009 and 2002, Prager, Sealy and Co. et al., 2005). In 1998, twenty-nine colleges had DEP greater than sixty

percent and sixty had DEP minus IGL greater than sixty percent. In 2008, the numbers of colleges exceeding the limit were sixty-two and 103, respectively. This increase in the number of institutions exceeding the tuition dependency threshold coupled with the gradual increase in DEP minus IGL suggests future financial difficulty for many institutions.

Are liquidity and flexibility associated with the annual percentage change in tuition?

The variable representing liquidity and flexibility was the Reserve ratio (RES). The limitations of this variable were discussed in Chapter 3. RES, controlling for all other variables, possesses a statistically significant association with TC. With a coefficient of -0.0036 (or -0.36 percent) RES explains a small portion of the annual percentage change in tuition. The interpretation of the coefficient is best illustrated using a hypothetical example. Assume the fictitious Alpha College has a RES score slightly above average at 1.5 and it falls to 1.0 over time. All other variables being equal, Alpha's expected annual increase in tuition would be approximately 0.18 percent greater than it would have been if the RES had remained stable at 1.5.

There has been no previous research on the association between liquidity and tuition. However, there are noteworthy differences in RES by Barron's category (see Figure 4-9). The hierarchy is very clear with most selective colleges possessing the highest RES and unranked and non-competitive colleges scoring lowest on the RES. Similar to the NOR, the RES data seem to confirm more selective colleges also possess the greatest wealth and therefore, have a larger cushion for systemic shock or change (change in enrollment, stock market volatility, unexpected increases in expenses).

Is leverage associated with the annual percentage change in tuition?

Leverage measures the use of debt. The variable used to proxy for leverage is the Capitalization ratio (CAP). As noted in Chapter 3, there is very little publicly available data on the use of debt in higher education institutions. CAP was statistically significant at a p-level less than 0.01 and possessed the largest coefficient of any variable in the study, -0.028 (or -2.8 percent). To interpret this result, consider the following fictional example: over time Alpha College's CAP falls from 0.85 to 0.50 and all other variables remain equal. As a result, Alpha's expected annual tuition increase is nearly one percent greater because of the decline in CAP (ex. now six percent versus previous five percent).

In addition to the association described above, there are CAP trends worth discussing. The overall CAP trend from 1998 through 2008 is downward and indicates colleges assumed more debt over the period. In 1998, CAP starts at 75 percent and falls to nearly 68 percent by 2008 (see Figure 4-10). The downward trend is true of all Barron's selectivity groups and there is almost no intersection of the trend lines between groups (see Figure 4-11). Like the RES, the selectivity hierarchy is very distinct for the CAP. The most selective colleges have the highest CAP (i.e. least debt). Unranked colleges have the lowest CAP (i.e. most debt).

There are two plausible explanations for the decrease in CAP. First, interest rates during the period studied were relatively low adding incentive for institutions to take on more debt. Second, the amenities war forced colleges to take on debt to finance building projects in efforts to remain competitive and appealing to prospective students.

Townsley (2009 and 2002) recommends a minimum acceptable CAP score of 50 percent. In 1998, thirty-five of the 452 institutions fell below the 50 percent standard. By 2008, sixty institutions fell below that standard. Not only did private baccalaureate colleges, on average, take on more debt during the period but more institutions were forced to take on debt that sent them

below the minimum acceptable standard. In other words, colleges with large amounts of debt at the start of the period took on even more debt during the period.

There are limitations to the CAP serving as a proxy for debt. CAP is only one measure of leverage and is not a comprehensive measure. Viability, debt load burden, interest burden, debt service, and leverage ratios are also very informative. Unfortunately, IPEDS does not collect the financial information necessary to complete these ratios. However, changes in IPEDS debt data collection are occurring. Since 2009, IPEDS reports data on project-related debt which allows for the calculation of the primary reserve and viability ratios at the core of the *Strategic Financial Analysis for Higher Education* framework (Prager and Sealy Co. et al., 2005). However, IPEDS remains limited in that it omits other important debt data; interest rate, debt service amounts, dates of maturity and current or noncurrent classifications.

Is asset performance associated with the annual percentage change in tuition?

The concept of asset performance assumes both physical and financial assets are used to generate revenue and net assets. Asset performance was measured using RNA in the model (Table 4-2) and is statistically significant at the 0.01 p-level with a coefficient of 0.0099 (or 0.99 percent). RNA was one of three variables adjusted for IGL (NOR and DEP were the others) and used in analysis of a revised model (see Appendix I). RNA minus IGL was significant at the 0.05 p-level with a coefficient of 0.0082 (0.82 percent). However, the same results did not hold when using robust standard errors. RNA minus IGL was not statistically significant in models using robust standard errors.

Again, a comparison to existing literature is impossible but some trends are worth noting. The benchmark for RNA is generally three to four percent after inflation (Prager, Sealy and Co., et al., 2005). The period average for RNA was nearly 6.8 percent and exceeded the benchmark.

However, the period average for RNA minus IGL was only 2.2 percent suggesting average institutional performance fell below the benchmark.

Is the tuition discount associated with the annual percentage change in tuition?

One might expect institutions with a lower tuition discount (TD) to increase tuition at a lower rate than institutions with a higher TD. Assuming two institutions raise tuition at the same rate, the institution discounting at a higher rate sees a smaller increase in tuition dollars than institutions discounting at a lower rate. Despite solid logic, the results were mixed. The 3:1 weighted model does not indicate a significant association between TC and TD when controlling for all other variables. The 1:1 weighted model does indicate a statistically significant association between TD and TC (see Appendix J). That the 3:1 weighted model does not indicate a statistically significant relationship between TC and TD (all other variables held equal) and the 1:1 weighted model does, may mean tuition-setting is, in part, the result the most recent changes in the tuition discount. However, more research on tuition discounting and its relationship with tuition-setting is needed before making any solid conclusions.

The TD trend indicates a gradual increase from 28 to nearly 34 percent from1998 through 2008. The result is consistent with NACUBO's 2010 Tuition Discounting survey which measures discount rate for full-time freshmen which grew from 37.7 percent in 2000 to 39.9 percent in 2008.

There are possible limitations with the TD definition used in this study. TD includes both funded and unfunded institutional aid. Data indicate most and highly selective institutions, arguably the wealthiest, discount at relatively high rates. However, they may have the financial wherewithal to discount heavily because their TD is primarily funded institutional aid. Two institutions with identical tuition discount rates may have sizable differences in their financial

condition assuming one discounts primarily with unfunded institutional aid (i.e. price reduction) versus the other which discounts using primarily funded institutional aid (i.e. endowed scholarship fund). Allan (2005) elaborates, "the better funded college would have more revenue and could be more selective… It could obtain the same revenue as the college with less funding [the college using more unfunded aid] at a lower yield." Colleges in the very competitive category discount at the highest rate and may have a larger proportion of unfunded to funded aid than their more selective peers. Future research could consider using only unfunded institutional aid (AKA the *simple tuition discount*) when examining tuition discounting.

The data in Figure 4-14 indicate unranked, noncompetitive, and less competitive colleges discount at much lower rates than colleges in the remainder of the selectivity hierarchy. The colleges in the less prestigious portion of the hierarchy may discount less because they set gross tuition at more reasonable rates and do not participate in the prestige pricing strategy that colleges in the more prestigious market do. One might say these less prestigious colleges participate in a value market in which they keep tuition low to attract students. Colleges in Barron's competitive category discount at the highest rate. These colleges may be attempting to attract better students via participation in the prestige market. However, to compete with the very competitive, highly competitive, and most competitive institutions, they are forced to discount at higher rates. Doti (2004) was referring to this market when stating "schools with lower student selectivity need to give back a high proportion of tuition increases to students in the form of discounts than do higher selectivity schools" (p. 366). Consistent with the data patterns in the current study, Doti's (2004) data indicate high selectivity colleges had an average discount rate of 33 percent versus 44.7 percent at less selective colleges.

Limitations

The model indicates a relatively weak association between tuition and financial condition. This weak finding does not necessarily indicate a lack of association but rather the model may omit one or more critical variables and/or contains misspecified variables. Additionally, limits in the amount and type of publicly available data made it difficult to find optimal proxies for the various elements of financial condition. On the other hand, a statistically significant association between tuition and financial condition may, in fact, not exist. The following section will discuss these limitations.

Measuring the external environment was challenging. Missing or omitted variables may have been a critical issue when identifying the right measures of the external or competitive environment. The model designed to address the research question included three external or market variables used to control for the effects of the financial (internal or institutional) variables on TC; Barron's selectivity rankings, region, and change in state per capita income. The Barron's selectivity rankings and regional dummy variables were designed to measure the competitive environment. Changes in state per capita income were designed to provide a measure of the economic environment.

Barron's rankings have been used effectively in previous research in higher education, including other tuition models (Koshal et al., 1999 and Dimkpah et al., 2004). However, region and state per capita income variables probably fail to fully represent the external environment for all colleges. For instance, the model included only four regions which, as they were time invariant, were excluded from the fixed effects model having no effect on the final results. Also, regions included widely different numbers of institutions. The Northeast, Midwest, South, and West included 113, 140, 163, and 36 institutions respectively. With so few institutions in the West, it is unlikely to have sufficient statistical power.

Change in state per capita income is incomplete as a measure of the economic environment because it is not necessarily associated with unemployment rate, changes in stock market, interest rate on debt, and other variables that may be 1) associated with tuition setting or 2) related to the college choice decision and, as a result, tuition setting. Furthermore, variables considering an institution's geographic draw (local, state, regional, national markets) can allow for a more accurate choice of environmental variables. For example, institutions drawing the majority of their students from their home state are impacted by different economic circumstances than institutions that attract students from the larger national market.

Better measures of the external or competitive environment may include; the average tuition rate and the number of institutions (for either or both private and public institutions) in the state or region. The average tuition rate from both public and private colleges allows for a measure of price competition. The number of public and private institutions indicate the extent and type of competition. For instance, fewer overall competitors may mean less pressure for keeping tuition increases low. Competition with public and private institutions is a legitimate concern for many private baccalaureate colleges. Institutions in the Barron's most and highly competitive categories may compete in a more national market than colleges with lower rankings and may compete less with public institutions in their state or region. Previous tuition model research has indicated associations between average competitor tuition rates and tuition. Rusk and Leslie (1978) found average state tuition rate to be a statistically significant predictor of tuition. Cunningham and Merisotis (2002) found a significant relationship between private college tuition and the tuition price of public competitors. In Harford and Marcus (1986), public tuition at top university in the state is associated with tuition at other institutions. Paulsen (1991) found average public university tuition was significantly associated with private college tuition.

Some variables in the model may have been misspecified and, as a result, may not have represented their intended concept or phenomena. First, the measure of TC, the dependent

variable, makes comparisons to existing tuition model research difficult. The tuition model developed in this study was designed to examine the growth in tuition measured here as the annual percentage change in tuition. Previous tuition model research uses either gross tuition or change in gross tuition, both measured in dollars. The researcher made the choice to scale the dependent variable as percentage change 1) to examine the routinely large percentage increases in tuition in private higher education, and 2) to maintain a scale comparable to the financial ratio variables which are measured as percentages.

As mentioned earlier, TD includes both funded and unfunded institutional aid in its computation. Unfunded institutional aid is strictly a discount in the gross tuition price. Funded institutional aid is financial aid supported by scholarship funds or endowment and generally represent a real source of resources not merely a price reduction. If most of the tuition discount is funded, as is likely at wealthier institutions, there is less of an impact on operating budgets than at colleges using unfunded aid merely to meet enrollment targets. Measuring TD using only unfunded aid (AKA simple tuition discount) may be a more accurate measure of financial condition and more likely to be linked to tuition.

Insufficient data was also an issue. Lack of publicly available data resulted in compromises in variable selection, namely RES and CAP, and the exclusion of several institutions form the analysis. RES was a compromise for the Primary Reserve Ratio recommended and used by NACUBO, *SFAHE* (Prager and Sealy Co. et al., 2005*)*, the U.S. Department of Education, and major credit ratings agencies. As such, RES may not have adequately represented liquidity and flexibility. Also, IPEDS collects and reports very little information on debt. The decision to use CAP was based primarily on data availability. As discussed previously, other measures of debt, particularly the Viability Ratio (Prager Sealy and Co. et al., 2005), are important but available IPEDS information did not allow for the use of other measures.

Changes in financial accounting standards for private nonprofit organizations in 1997 also resulted in data insufficiency. Adding more time periods or institutions to the study would enhance the model's explanatory power. However, comparisons to periods before the 1997 change in financial accounting standards are impossible. Additionally, the transition to the new accounting standards resulted in erroneous or incomplete IPEDS data reporting, particularly from 1997 through 1999. Nearly 30 colleges were excluded from the study because they had multiple years of missing or erroneous data.

Another possible but unlikely limitation in this study is that the researcher assumed tuition setting is a rational process based on financial and external information when, in fact, no such rational decision making takes place. There simply could be little association between tuition and financial condition. Under this assumption, tuition setting is based on the umbrella effect under which the most prestigious colleges set tuition first and those colleges in less prestigious categories set their tuition rates accordingly (Massy 2003; Litten, 1984; Yanikoski, 1989). The umbrella effect is an example of competition-based pricing in which sellers set price based on competitors' pricing without consideration of costs or customer demand.

Yanikoski (1989, pg. 84) is especially critical in describing the lack of analysis or information involved in the tuition setting decision:

> *Tuition pricing in higher education tends to be an analytically soft activity. Consider that tuition prices in most four-year colleges and universities are based on very little market research, are only loosely tied to reliable cost information, and are bound to a tangle of ideological preferences. The Higher Education Price Index, one of the few detailed cost indicators available, is used by not even a quarter of the state agencies that set tuition policy. Annual tuition prices in both public and private institutions seem to be derived, more often than not, from a congeries of presumptions, budgetary extrapolations, and "squeaky wheel" exigencies – tempered by deference to political realities and*

> *competitors' price trends. Relatively few institutions are known to base their price structures and annual price changes on a well-researched, broadly debated, long-term planning strategy.*

There is more recent agreement with Yanikoski's critique. One estimate indicates only 15 percent of college governing boards use long-term strategic financial planning and only 35 percent have minimal knowledge of fiscal planning (Thomas C. Longin at the Association of Governing Boards and Universities 2009 annual meeting in Fain 2009). With such a small percentage of governing boards using or understanding financial planning, it's not a stretch to suggest financial variables do not have a strong relationship to tuition setting. However, there are probably very few college administrators willing to admit little-to-no financial analysis guides tuition setting. There are opportunities for administrators, policy makers, and researchers to more closely examine the presumptions, extrapolations, political realities, and trends that guide tuition.

Implications/Recommendations

This research, both the analysis and the descriptive and trend data, can better inform the decision-making process for administrators, trustees, researchers, and other institutional policy makers. What follows are general suggestions for college and university administrators and trustees. Specific suggestions for future research are found in the next section. Again, given the relatively weak findings, any recommendations here ought to be weighed cautiously until future research can provide more clarity.

Although the model was relatively weak overall, it did indicate a statistically strong and inverse relationship between debt (leverage) and the annual percentage change in tuition. If, in fact, institutions with less debt increase tuition at lower rates than institutions with more debt, trustees and administrators ought to be cautious of both the total amount of debt and changes in

debt. The caution is especially important given the increasing debt levels (decreasing CAP) from 1998 through 2008. Future research on this association will benefit from recent changes in IPEDS data collection and reporting.

Liquidity and flexibility was also a significant predictor of the annual percentage change in tuition. All things held equal, there is a negative relationship between liquidity and the annual percentage change in tuition. Because the measure of liquidity in this study includes only unrestricted net assets, the ratio of unrestricted net assets and restricted net assets is important for tuition setting. Those colleges with a greater percentage of unrestricted to restricted net assets have more flexibility in operations and may keep tuition increases in check. Also, when development officers pursue gifts, it may be important for them to understand the association with tuition rate and encourage donors to limit or avoid restrictions on their gifts in order to enhance and preserve liquidity and flexibility.

College leaders might be especially interested in the very clear hierarchical patterns of both leverage and debt (CAP) and liquidity and flexibility (RES) ratios as they relate to the Barron's selectivity categories. Institutional leaders generally desire to enhance their institution's prestige. To enhance prestige, institutions participate in what Winston (2000, p. 2) called "the positional arms race" which results in ever increasing spending. Ever increasing spending is supported only by ever increasing cash flow. According to the data in this study, the most prestigious colleges are also the ones with the least debt and the most resources. Spending for the most prestigious institutions is easier than for those less prestigious institutions with more debt and fewer resources. This finding suggests institutional decision-makers ought to concentrate carefully on strategies to enhance unrestricted resources. Also, administrators should use debt with a very clear idea of the estimated return. Ideally, debt should not be used to preserve the status quo but instead leveraged to generate additional resources. Using debt without generating net revenue may stabilize the competitive position of the college temporarily but, without

eventual increases in net revenue, may result in negative long-term consequences for the college's financial condition.

The analysis of the association between tuition discount and the annual percentage change in tuition produced mixed results. Potential reasons for these results were previously discussed in the Limitations section. However, the trend in tuition discount indicated a steady increase from 1998 through 2008 while annual tuition change remained relatively flat at 6 percent annually from 2001 to 2008. The pattern suggests that for each dollar of tuition increase, institutions are gaining less in net tuition per student in each successive year. The credit market crisis in late 2008 may have made this situation worse. The tuition change for the 452 private colleges in this study dropped from 6.1 percent in 2008 to 4.2 percent in 2009. The 2010 NACUBO Tuition Discounting Study Report (NACUBO, 2011) indicated an increase of the freshman discount rate from 39.9 percent in 2008 to 41.6 percent in 2009, the largest one-year increase in over a decade. The pairing of a smaller increase in gross tuition and a large increase in tuition discount is a concern if the pattern continues. In that event, institutions will struggle to serve the same number of students with fewer available resources.

The patterns in tuition change and tuition discount may indicate differences in the way college administrators interpret economic events. Following the stock market downturn in 2001/2002, institutions, on average, raised tuition at over 6 percent annually even after the stock market had rebounded. During that time the tuition discount increased at a much slower rate than it had the previous decade. Following the credit market crisis in late 2008, the average tuition increase in 2009 was only 4.2 percent and the tuition discount increased at the greatest one-year rate during the past decade. Although short term, the pattern may indicate that institutional leadership recognizes the importance of student loans for institutional survival. As a result, institutions may react to credit market shocks as more of a threat than major stock market declines. Administrators can and should do more to determine the extent of these threats at their

respective institutions and researchers have an opportunity to evaluate differences in institutional responses to these threats.

Future Research

The following section provides suggestions specifically for researchers and scholars interested in examining tuition and financial condition. First, suggested improvements to tuition models will be discussed followed by discussions of future research on financial condition and the possibility of examining the umbrella effect for tuition pricing in higher education.

The following tuition model suggestions were discussed previously in the context of this study but can inform future tuition model research. Future researchers can measure tuition, the dependent variable, in both dollars and percentage increase, and examine both the overall level of tuition (dollars) and the change in tuition (dollars or percentage). Measures of dependence on total student revenue (tuition, room and board, and fees), versus tuition dependency, may offer a clearer picture of dependency particularly for residential campuses. Starting in 2009, IPEDS now reports data on project-related debt will allow for better measures of debt and liquidity namely the Viability and Primary Reserve ratio, core ratios in *SFAHE* (Prager, Sealy, and co. et al., 2005). Using the *simple tuition discount* to examine differences between unfunded and funded aid may identify previously unknown associations with tuition and/or other financial measures. The most difficult charge for future researchers is to consider or develop better measures of the external or competitive environment. These measures may include; refinements of geographic or regional variables based on market draw (local, region, national), average tuition rate for public and private competitors, the number of public and private competitors, unemployment rate, stock market and credit market changes, and changes in the traditional-aged college population.

Recent research in the Accounting literature discusses the cross-sectional and time series dependence issue, common in panel data analysis which has both cross-sectional and time properties. This dependence can result in misspecified test statistics. The most common method of addressing this issue is the use of cluster-robust standard errors. Generally when using cluster-robust errors, the researcher chooses whether to cluster by cross-section (institution) or time. In this study, the researcher clustered by institution (see robust estimates in Table 4-2 and Appendices F and G). For the model used in this study, it was not feasible to cluster by time because the number of independent variables exceeded the number of years and the Stata software used for the analysis would lack the needed degrees of freedom to assess the overall significance of the model (StataCorp, 2005). New research (Cameron, Gelbach, and Miller, 2009; and Gow, Ormazabal, and Taylor, 2010) discusses possible methods for clustering on both dimensions, time and cross-section, simultaneously via two-way clustering. Gow et. al (2010) find that using two-way clustering as a means of correcting for both time series and cross section dependence "substantially alters inferences reported in the literature" (pg. 483). Future research on tuition models can utilize these recent advances in econometric analysis.

Results of this study also highlight some possibilities for future research on financial condition in higher education. As discussed previously, researchers could examine the relationship between the Net Operating Revenues ratio, size of endowment (wealth), and investment gains and losses in an effort to better understand impact of endowment and wealth (or lack thereof) on college operations. Also, the data may indicate differences in the institutional response to stock market and credit market shocks. On this issue, there are opportunities to collect and examine data following the 2008 credit market crisis.

Although more publicly available information on debt is needed, researchers can examine institutions' Form 990 and financial statements, interview presidents and chief financial officers,

and consider case studies as means of better understanding the increased use of debt in higher education.

There are also opportunities to evaluate the impact of tuition and the tuition discount on financial condition. Research models of this type differ from this study's model in that they designate tuition and tuition discount as an independent variable with various financial condition variables serving as the dependent variable in separate models. Models of this type could examine the relationships between tuition discounting policies and operations, debt, liquidity, and asset efficiency. Several articles in the higher education practitioner literature suggest discounting has negative consequences on financial condition yet little empirical research has been undertaken to examine that assertion.

One of the possible explanations for the low explanatory power of this study's model is the presence of the umbrella effect on tuition setting and the model's inability to measure the effect. The umbrella effect suggests tuition setting is the result of waiting or anticipating what top colleges will do and then acting accordingly. Albeit challenging, future research could identify market leaders and compare the timing of the tuition announcements of peer institutions. To better understand the phenomenon, researchers could identify clusters of peer institutions using athletic conference, geographic location, or institution type (Yanikoski, 1989). Research of this type may help identify the relevant nonfinancial data college boards of trustees use in setting tuition.

Summary

Private nonprofit baccalaureate colleges are a vital part of U.S. higher education. They offer a learning-centered alternative to larger, research universities. Low faculty-students ratios, liberal arts curricula, and faculty contact are commonly found in private baccalaureate colleges

but, these are features that are very expensive. Generally, these colleges have weathered financial challenges and fierce competition for decades. Many previous studies on financial condition offered catastrophic predictions. This researcher will stop short of dire predictions but makes some general observations. Given the large number of institutions averaging deficits for the entire period of the study, it is remarkable that so many institutions survived. Also, this study identified negative trends and patterns related to colleges' use of debt and growth in the tuition discount rate. If these trends continue, it is hard to believe all 452 institutions will persist. Although not to the extent anticipated, the study found small associations between tuition and the level of debt, the level of reserves, and the return on net assets.

Certainly more research is needed to better explain tuition setting. Paulsen (2001) believed tuition research ought to

> *empower higher education scholars and policy-makers with both the understanding and resolve to reverse the trends of tuition inflation and reduced affordability and their destructive effects on the equity of access, choice, persistence, and attainment in higher education in the not-too-distant future* (p. 251).

Ideally, this study provides guidance to future researchers in terms of design, methods, model development, and the relationship between tuition and financial condition. For higher education stakeholders, this study identifies trends and relationships that may be useful in keeping tuition increases in check and in evaluating and enhancing the financial condition of colleges and universities.

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Appendix A

Overall Descriptive Data

Tuition Change	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Mean	0.0499	0.0230	0.0511	0.0599	0.0604	0.0613	0.0649	0.0605	0.0625	0.0644	0.0611	0.0563
Median	0.0460	0.0322	0.0477	0.0504	0.0527	0.0575	0.0590	0.0582	0.0599	0.0599	0.0580	
Standard Deviation	0.0546	0.0582	0.0355	0.0481	0.0612	0.0742	0.0575	0.0349	0.0318	0.0336	0.0446	
Net Operating Revenues ratio												
Mean	0.2336	0.1746	0.1585	-0.0358	-0.2590	0.0403	0.1612	0.1193	0.1451	0.2177	-0.0544	0.0819
Median	0.2100	0.1459	0.1190	0.0155	-0.0459	0.0174	0.1295	0.1009	0.1297	0.1931	0.0005	
Standard Deviation	0.1945	0.1927	0.2509	0.7509	1.4351	0.4119	0.1502	0.1542	0.1582	0.1875	0.3332	
Net Operating Revenues ratio minus Investment Gains and Losses												
Mean	0.0374	0.0239	0.0168	0.0063	-0.0355	-0.0419	-0.0130	-0.0180	-0.0095	0.0063	-0.0163	-0.0039
Median	0.0361	0.0228	0.0281	0.0073	-0.0067	-0.0149	0.0036	0.0068	0.0178	0.0206	0.0065	
Standard Deviation	0.2015	0.2009	0.1824	0.2154	0.2181	0.1984	0.1674	0.1841	0.2209	0.2057	0.1851	
Tuition Dependency												
Mean	0.3838	0.4065	0.4011	0.4887	0.5682	0.4690	0.4253	0.4523	0.4359	0.4083	0.5320	0.4519
Median	0.3762	0.4057	0.4026	0.4851	0.5475	0.4867	0.4202	0.4548	0.4265	0.4021	0.5364	
Standard Deviation	0.1477	0.1469	0.1580	0.2739	0.4245	0.2332	0.1552	0.1585	0.1493	0.1567	0.2064	
Tuition Dependency minus Investment Gains and Losses												
Mean	0.4717	0.4712	0.4601	0.4667	0.4910	0.5001	0.5014	0.5111	0.5030	0.5034	0.5155	0.4905
Median	0.4787	0.4734	0.4656	0.4693	0.4990	0.5096	0.5108	0.5127	0.5067	0.5042	0.5211	
Standard Deviation	0.1359	0.1349	0.1415	0.1405	0.1405	0.1361	0.1417	0.1392	0.1375	0.1406	0.1407	
Reserve Ratio												
Mean	1.6751	1.6302	1.7111	1.5517	1.3721	1.3291	1.4148	1.4350	1.4903	1.6221	1.4889	1.5200
Median	1.1559	1.1227	1.1910	1.1005	1.0132	1.0043	1.0385	1.0343	1.0611	1.1666	1.0913	
Standard Deviation	1.9072	1.8721	1.8318	1.6928	1.5302	1.4459	1.5855	1.6208	1.6940	1.8653	1.6611	
Capitalization Ratio												
Mean	0.7542	0.7447	0.7367	0.7228	0.6978	0.6885	0.6935	0.6928	0.6936	0.6980	0.6831	0.7096
Median	0.7972	0.7836	0.7776	0.7576	0.7347	0.7229	0.7226	0.7249	0.7350	0.7366	0.7283	
Standard Deviation	0.1756	0.1758	0.1754	0.1745	0.1803	0.1759	0.1705	0.1713	0.1707	0.1719	0.1787	
Return on Net Asset ratio												
Mean	0.1599	0.1049	0.0511	0.0395	-0.0082	0.0296	0.0916	0.0657	0.0824	0.1277	0.0004	0.0677
Median	0.1280	0.0776	0.0661	0.0078	-0.0182	0.0079	0.0870	0.0533	0.0734	0.1178	0.0002	
Standard Deviation	0.2838	0.1812	0.7046	0.2586	0.1197	0.1656	0.1269	0.1342	0.1373	0.1844	0.2096	
Return on Net Asset ratio minus Investment Gains and Losses												
Mean	0.0568	0.0453	-0.0157	0.0319	0.0098	0.0134	0.0207	0.0158	0.0247	0.0313	0.0079	0.0220
Median	0.0184	0.0095	0.0115	0.0037	-0.0020	-0.0067	0.0015	0.0032	0.0078	0.0100	0.0028	
Standard Deviation	0.2429	0.1755	0.6704	0.2004	0.1173	0.1660	0.1295	0.1339	0.1380	0.1760	0.2048	
Tuition Discount												
Mean	0.2812	0.3079	0.3108	0.3121	0.3137	0.3180	0.3220	0.3220	0.3310	0.3328	0.3381	0.3172
Median	0.2905	0.3074	0.3128	0.3194	0.3200	0.3228	0.3336	0.3345	0.3400	0.3374	0.3452	
Standard Deviation	0.1923	0.1819	0.1511	0.1532	0.1462	0.1464	0.1427	0.1417	0.1391	0.1398	0.1391	
State Per Capita Income												
Mean	0.0593	0.0371	0.0639	0.0263	0.0132	0.0247	0.0492	0.0411	0.0564	0.0513	0.0322	0.0413
Median	0.0582	0.0362	0.0611	0.0212	0.0158	0.0228	0.0504	0.0386	0.0550	0.0526	0.0336	
Standard Deviation	0.0080	0.0093	0.0146	0.0140	0.0121	0.0106	0.0129	0.0190	0.0295	0.0118	0.0092	
	n=452	n=452	n=452	n=452	n=452	n=452	n=452	n=452	n=452	n=452	n=452	

Appendix B

Descriptive Data by Barron's Selectivity Rank

Tuition Change												
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Unranked												
Mean	0.0678	0.0067	0.0609	0.0777	0.0669	0.0508	0.0864	0.0790	0.0582	0.0732	0.0509	0.0617
Standard Deviation	0.0561	0.0918	0.0364	0.0604	0.0981	0.0738	0.0565	0.0632	0.0302	0.0451	0.0556	
Non-Competitive												
Mean	0.0904	-0.0451	0.0581	0.0516	0.0968	0.0589	0.0831	0.0699	0.0927	0.0503	0.0598	0.0606
Standard Deviation	0.1776	0.0813	0.0675	0.0619	0.1310	0.2638	0.1126	0.0518	0.0977	0.0300	0.0424	
Less Competitive												
Mean	0.0379	0.0164	0.0496	0.0696	0.0648	0.0527	0.0605	0.0545	0.0643	0.0637	0.0580	0.0538
Standard Deviation	0.0619	0.0728	0.0537	0.0512	0.0768	0.0627	0.0803	0.0371	0.0341	0.0367	0.0293	
Competitive												
Mean	0.0498	0.0312	0.0524	0.0556	0.0607	0.0654	0.0606	0.0571	0.0603	0.0662	0.0646	0.0567
Standard Deviation	0.0281	0.0400	0.0241	0.0490	0.0543	0.0502	0.0546	0.0327	0.0285	0.0383	0.0610	
Very Competitive												
Mean	0.0454	0.0283	0.0490	0.0582	0.0546	0.0704	0.0659	0.0625	0.0601	0.0624	0.0612	0.0562
Standard Deviation	0.0189	0.0607	0.0359	0.0295	0.0340	0.0814	0.0285	0.0216	0.0164	0.0248	0.0218	
Highly Competitive												
Mean	0.0426	0.0290	0.0478	0.0480	0.0506	0.0580	0.0660	0.0622	0.0653	0.0626	0.0659	0.0544
Standard Deviation	0.0095	0.0263	0.0168	0.0345	0.0145	0.0098	0.0444	0.0181	0.0209	0.0143	0.0227	
Most Competitive												
Mean	0.0692	0.0270	0.0392	0.0651	0.0494	0.0534	0.0561	0.0576	0.0617	0.0586	0.0535	0.0537
Standard Deviation	0.1150	0.0227	0.0169	0.0675	0.0174	0.0169	0.0185	0.0133	0.0158	0.0150	0.0086	
Net Operating Revenues ratio												
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Unranked												
Mean	0.1272	0.1110	0.0839	0.0209	-0.0470	0.0063	0.1057	0.0617	0.0800	0.1166	0.0044	0.0610
Standard Deviation	0.1604	0.1340	0.1288	0.1862	0.3776	0.1750	0.1272	0.1108	0.1406	0.1484	0.1426	
Non-Competitive												
Mean	0.0828	0.1260	0.0662	0.0516	0.0195	0.0360	0.1065	0.0754	0.0850	0.1185	0.0762	0.0767
Standard Deviation	0.1567	0.1199	0.1206	0.1476	0.1533	0.1522	0.0918	0.0864	0.0824	0.0983	0.1448	
Less Competitive												
Mean	0.1134	0.0672	0.0444	-0.0055	-0.0344	0.0175	0.0726	0.0587	0.0697	0.1077	0.0006	0.0465
Standard Deviation	0.1145	0.1364	0.1138	0.1070	0.1676	0.0823	0.0851	0.1135	0.1134	0.1290	0.1207	
Competitive												
Mean	0.2091	0.1651	0.1034	0.0303	-0.1213	0.0390	0.1343	0.0946	0.1166	0.1815	-0.0507	0.0820
Standard Deviation	0.1644	0.1796	0.2195	0.5550	0.3757	0.3591	0.1249	0.1317	0.1111	0.1433	0.2593	
Very Competitive												
Mean	0.3072	0.2344	0.2396	-0.0839	-0.2485	0.0245	0.1829	0.1259	0.1689	0.2658	-0.1424	0.0977
Standard Deviation	0.1775	0.1935	0.2949	0.9228	2.1370	0.5672	0.1245	0.1403	0.1798	0.1801	0.5370	
Highly Competitive												
Mean	0.4011	0.2740	0.3423	-0.3307	-0.6489	0.0401	0.2922	0.2312	0.2700	0.3917	-0.0517	0.1101
Standard Deviation	0.1882	0.1780	0.2827	1.1393	1.4236	0.2039	0.1509	0.1312	0.1513	0.1425	0.4180	
Most Competitive												
Mean	0.5041	0.3372	0.4827	0.0264	-1.9321	0.2645	0.4610	0.3975	0.4342	0.5827	-0.1454	0.1284
Standard Deviation	0.1761	0.3195	0.2577	1.7824	4.1665	1.0798	0.1215	0.2299	0.1209	0.1411	0.3961	

Appendix B

Descriptive Data by Barron's Selectivity Rank continued

Net Operating Revenues ratio minus Investment Gains and Losses												
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Unranked												
Mean	0.0602	0.0600	0.0389	0.0155	-0.0137	-0.0008	0.0546	0.0215	0.0396	0.0585	0.0040	0.0307
Standard Deviation	0.1491	0.1514	0.1473	0.1532	0.2029	0.1506	0.1430	0.1093	0.1332	0.1370	0.1390	
Non-Competitive												
Mean	0.0111	0.0749	0.0234	0.0536	0.0469	0.0106	0.0486	0.0247	0.0407	0.0326	0.0874	0.0413
Standard Deviation	0.1436	0.1228	0.1218	0.1450	0.1113	0.1560	0.0947	0.0841	0.0760	0.0824	0.1248	
Less Competitive												
Mean	0.0250	-0.0011	-0.0042	-0.0180	-0.0117	0.0001	0.0207	0.0144	0.0235	0.0167	0.0104	0.0069
Standard Deviation	0.1143	0.1517	0.1073	0.1171	0.1237	0.0789	0.0805	0.1159	0.1201	0.1415	0.1214	
Competitive												
Mean	0.0492	0.0441	0.0259	0.0110	-0.0178	-0.0255	0.0046	0.0083	0.0114	0.0194	-0.0066	0.0113
Standard Deviation	0.1667	0.1730	0.1463	0.2124	0.1688	0.1682	0.1460	0.1268	0.1222	0.1629	0.1555	
Very Competitive												
Mean	0.0321	0.0312	0.0446	0.0400	-0.0535	-0.0956	-0.0763	-0.0740	-0.0673	-0.0429	-0.0410	-0.0275
Standard Deviation	0.2212	0.1991	0.2408	0.2788	0.3041	0.2488	0.2036	0.2424	0.4060	0.3000	0.2446	
Highly Competitive												
Mean	0.0385	0.0105	-0.0122	-0.0087	-0.0834	-0.0945	-0.0783	-0.0787	-0.0517	-0.0181	-0.0582	-0.0395
Standard Deviation	0.2639	0.2384	0.2039	0.2298	0.2946	0.2591	0.2228	0.2195	0.2024	0.2011	0.1952	
Most Competitive												
Mean	-0.0135	-0.1429	-0.0658	-0.0916	-0.1834	-0.1068	-0.0429	-0.0874	-0.0966	0.0029	-0.1110	-0.0854
Standard Deviation	0.4532	0.4247	0.3508	0.3062	0.2522	0.3428	0.2251	0.3910	0.2496	0.3586	0.3187	
Tuition Dependency												
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Unranked												
Mean	0.4040	0.4287	0.4314	0.4646	0.4991	0.4824	0.4620	0.4766	0.4623	0.4541	0.5019	0.4607
Standard Deviation	0.1162	0.1410	0.1348	0.1535	0.1436	0.1363	0.1484	0.1514	0.1540	0.1384	0.1675	
Non-Competitive												
Mean	0.4235	0.4202	0.4423	0.4440	0.4617	0.4690	0.4359	0.4611	0.4542	0.4537	0.4830	0.4499
Standard Deviation	0.1706	0.1943	0.2079	0.2276	0.2180	0.1991	0.1946	0.1822	0.1877	0.2065	0.2181	
Less Competitive												
Mean	0.4451	0.4536	0.4421	0.4697	0.5137	0.4982	0.4814	0.4951	0.4869	0.4709	0.5345	0.4810
Standard Deviation	0.1596	0.1446	0.1620	0.1576	0.1787	0.1556	0.1632	0.1675	0.1478	0.1518	0.1612	
Competitive												
Mean	0.4143	0.4341	0.4445	0.4853	0.5589	0.4942	0.4629	0.4891	0.4733	0.4456	0.5543	0.4779
Standard Deviation	0.1410	0.1413	0.1466	0.1981	0.1791	0.1966	0.1399	0.1559	0.1359	0.1445	0.1708	
Very Competitive												
Mean	0.3309	0.3579	0.3520	0.5012	0.5421	0.4123	0.3765	0.4168	0.3938	0.3575	0.5321	0.4157
Standard Deviation	0.1261	0.1353	0.1256	0.2547	0.5324	0.3991	0.1274	0.1234	0.1229	0.1220	0.2965	
Highly Competitive												
Mean	0.3099	0.3585	0.3145	0.6151	0.7305	0.4608	0.3408	0.3762	0.3571	0.3105	0.5269	0.4273
Standard Deviation	0.1196	0.1222	0.1428	0.4750	0.5197	0.1234	0.1297	0.1255	0.1217	0.1233	0.2100	
Most Competitive												
Mean	0.2275	0.2645	0.2128	0.3242	0.7813	0.3806	0.2304	0.2650	0.2350	0.1880	0.4468	0.3233
Standard Deviation	0.0851	0.1109	0.1201	0.5641	1.2833	0.1452	0.0953	0.1167	0.0976	0.1019	0.2196	

Appendix B

Descriptive Data by Barron's Selectivity Rank continued

Tuition Dependency minus Investment Gains and Losses												
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Unranked												
Mean	0.4350	0.4505	0.4494	0.4678	0.4888	0.4862	0.4864	0.4950	0.4815	0.4824	0.5024	0.4750
Standard Deviation	0.1156	0.1401	0.1314	0.1512	0.1247	0.1355	0.1495	0.1491	0.1529	0.1348	0.1660	
Non-Competitive												
Mean	0.4594	0.4457	0.4626	0.4428	0.4508	0.4813	0.4634	0.4874	0.4770	0.4968	0.4789	0.4678
Standard Deviation	0.1852	0.2037	0.2151	0.2281	0.2172	0.2035	0.1999	0.1951	0.1934	0.2137	0.2185	
Less Competitive												
Mean	0.4887	0.4851	0.4647	0.4740	0.5000	0.5065	0.5080	0.5168	0.5102	0.5143	0.5275	0.4996
Standard Deviation	0.1662	0.1487	0.1698	0.1584	0.1528	0.1561	0.1672	0.1708	0.1510	0.1550	0.1544	
Competitive												
Mean	0.4907	0.4916	0.4823	0.4892	0.5138	0.5206	0.5253	0.5272	0.5248	0.5246	0.5324	0.5111
Standard Deviation	0.1333	0.1334	0.1347	0.1342	0.1405	0.1304	0.1345	0.1290	0.1327	0.1387	0.1332	
Very Competitive												
Mean	0.4420	0.4345	0.4244	0.4344	0.4555	0.4694	0.4781	0.4969	0.4840	0.4835	0.5032	0.4642
Standard Deviation	0.1211	0.1204	0.1285	0.1194	0.1241	0.1269	0.1149	0.1147	0.1233	0.1164	0.1181	
Highly Competitive												
Mean	0.4743	0.4760	0.4623	0.4664	0.4882	0.5114	0.5033	0.5133	0.5040	0.5031	0.5139	0.4924
Standard Deviation	0.1083	0.1095	0.1036	0.1144	0.1225	0.1048	0.1283	0.1234	0.1211	0.1256	0.1131	
Most Competitive												
Mean	0.4432	0.4494	0.4217	0.4057	0.4565	0.4483	0.4313	0.4599	0.4350	0.4166	0.4384	0.4369
Standard Deviation	0.1118	0.1060	0.1371	0.1259	0.1301	0.1212	0.1294	0.1423	0.1101	0.1376	0.1508	
Reserve Ratio												
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Unranked												
Mean	0.7233	0.7142	0.7010	0.6691	0.5967	0.5903	0.6243	0.6407	0.6469	0.6847	0.6877	0.6617
Standard Deviation	0.5780	0.5133	0.6172	0.5418	0.5202	0.5116	0.4855	0.5141	0.5138	0.5406	0.6691	
Non-Competitive												
Mean	0.8660	0.8336	0.8237	0.7720	0.6370	0.7262	0.7873	0.7240	0.7875	0.8447	0.8077	0.7827
Standard Deviation	0.4088	0.3888	0.3773	0.3819	0.3279	0.4285	0.4736	0.4948	0.6138	0.6164	0.5729	
Less Competitive												
Mean	0.7942	0.6329	0.7773	0.7083	0.6513	0.6449	0.6527	0.6702	0.6883	0.7519	0.7208	0.6993
Standard Deviation	0.6228	0.7604	0.5843	0.5265	0.4938	0.4946	0.4821	0.4840	0.4952	0.6122	0.6750	
Competitive												
Mean	1.3098	1.2923	1.3381	1.2251	1.1021	1.0667	1.1153	1.1113	1.1428	1.2307	1.1348	1.1881
Standard Deviation	1.0593	1.1146	1.0676	1.0085	0.8909	0.8768	0.8904	0.8839	0.8847	0.9537	0.8928	
Very Competitive												
Mean	2.2960	2.1890	2.2479	2.0004	1.7516	1.6585	1.7709	1.8011	1.8396	1.9802	1.7581	1.9358
Standard Deviation	2.2444	1.8772	1.7475	1.4798	1.2763	1.1691	1.2579	1.2611	1.2434	1.3658	1.1917	
Highly Competitive												
Mean	3.2715	3.3218	3.3552	3.1164	2.7437	2.6286	2.8545	2.9175	3.0295	3.3880	3.0725	3.0636
Standard Deviation	3.2529	3.1557	2.6553	2.8028	2.7949	2.5993	2.9149	2.9701	3.0079	3.2766	2.7064	
Most Competitive												
Mean	4.0628	4.1928	4.7471	4.1056	3.5065	3.4701	3.8275	3.9786	4.3830	4.7912	4.4341	4.1363
Standard Deviation	2.1389	2.4116	3.2124	2.7740	2.3369	2.1431	2.4353	2.5402	2.9276	3.2719	3.0477	

Appendix B

Descriptive Data by Barron's Selectivity Rank continued

Capitalization Ratio												
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Unranked												
Mean	0.6439	0.6299	0.6181	0.6326	0.5835	0.5914	0.5942	0.5829	0.5894	0.5963	0.5718	0.6031
Standard Deviation	0.2799	0.2848	0.2766	0.2577	0.2576	0.2485	0.2102	0.2029	0.2049	0.2113	0.2400	
Non-Competitive												
Mean	0.7690	0.7851	0.7458	0.7199	0.6563	0.6595	0.6596	0.6491	0.6531	0.6688	0.6785	0.6950
Standard Deviation	0.1342	0.0987	0.1414	0.1499	0.1624	0.1330	0.1147	0.1372	0.1340	0.1376	0.1465	
Less Competitive												
Mean	0.6965	0.6832	0.6696	0.6487	0.6195	0.6115	0.6175	0.6151	0.6191	0.6201	0.6028	0.6367
Standard Deviation	0.1889	0.1860	0.1803	0.1843	0.1891	0.1861	0.1810	0.1820	0.1816	0.1924	0.1947	
Competitive												
Mean	0.7498	0.7399	0.7268	0.7086	0.6895	0.6753	0.6771	0.6798	0.6796	0.6806	0.6661	0.6975
Standard Deviation	0.1654	0.1661	0.1721	0.1758	0.1802	0.1767	0.1759	0.1770	0.1794	0.1751	0.1813	
Very Competitive												
Mean	0.7984	0.7872	0.7929	0.7856	0.7663	0.7550	0.7652	0.7640	0.7581	0.7692	0.7542	0.7724
Standard Deviation	0.1414	0.1385	0.1150	0.1086	0.1141	0.1181	0.1135	0.1110	0.1055	0.1010	0.0984	
Highly Competitive												
Mean	0.8210	0.8164	0.8203	0.8025	0.7837	0.7743	0.7834	0.7833	0.7872	0.7951	0.7779	0.7950
Standard Deviation	0.0888	0.0887	0.0849	0.0928	0.0911	0.0884	0.0945	0.0914	0.0883	0.0864	0.0877	
Most Competitive												
Mean	0.8650	0.8603	0.8596	0.8457	0.8243	0.8170	0.8206	0.8275	0.8300	0.8284	0.8239	0.8366
Standard Deviation	0.0411	0.0503	0.0534	0.0554	0.0611	0.0582	0.0561	0.0538	0.0543	0.0554	0.0682	
Return on Net Asset ratio												
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Unranked												
Mean	0.2526	0.1480	-0.2117	0.1917	0.0273	0.0538	0.1358	0.1030	0.1061	0.1534	-0.0335	0.0842
Standard Deviation	0.6941	0.4043	1.6728	0.6025	0.1842	0.3751	0.3176	0.3516	0.1942	0.3298	0.3564	
Non-Competitive												
Mean	0.0502	0.1534	0.0554	0.0698	0.0561	0.0641	0.0867	0.0862	0.1045	0.1450	0.2224	0.0994
Standard Deviation	0.1750	0.2052	0.1280	0.1675	0.1515	0.2003	0.1199	0.1032	0.1311	0.1702	0.6162	
Less Competitive												
Mean	0.1322	0.0827	0.1023	0.0459	-0.0042	0.0365	0.0755	0.0593	0.0772	0.1199	0.0061	0.0667
Standard Deviation	0.2075	0.1422	0.3635	0.3412	0.1038	0.1028	0.0998	0.1348	0.1199	0.2389	0.1958	
Competitive												
Mean	0.1635	0.1084	0.0684	0.0297	-0.0073	0.0297	0.0867	0.0581	0.0695	0.1081	-0.0085	0.0642
Standard Deviation	0.2737	0.1490	0.0960	0.1669	0.1328	0.1450	0.1023	0.0969	0.1695	0.1755	0.1792	
Very Competitive												
Mean	0.1583	0.1032	0.0180	0.0183	-0.0203	0.0078	0.0821	0.0544	0.0806	0.1322	-0.0085	0.0569
Standard Deviation	0.1298	0.1743	1.1195	0.1135	0.0754	0.0668	0.0732	0.0440	0.0706	0.1085	0.0710	
Highly Competitive												
Mean	0.1595	0.0883	0.1158	0.0061	-0.0250	0.0087	0.1059	0.0763	0.0921	0.1493	-0.0043	0.0702
Standard Deviation	0.0710	0.0507	0.0902	0.0762	0.0910	0.0378	0.0679	0.0497	0.0582	0.0407	0.0545	
Most Competitive												
Mean	0.1528	0.0918	0.1783	-0.0424	-0.0545	0.0701	0.1210	0.0888	0.1305	0.1869	-0.0020	0.0837
Standard Deviation	0.0571	0.0707	0.1330	0.0823	0.0633	0.2927	0.0253	0.0456	0.1198	0.0648	0.0728	

Appendix B

Descriptive Data by Barron's Selectivity Rank continued

Return on Net Asset ratio minus Investment Gains and Losses												
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Unranked												
Mean	0.1200	0.1134	-0.2338	0.1657	0.0149	0.0376	0.0883	0.0719	0.0703	0.0930	-0.0339	0.0461
Standard Deviation	0.4235	0.4016	1.6352	0.5389	0.1951	0.3801	0.3253	0.3518	0.1946	0.3000	0.3329	
Non-Competitive												
Mean	-0.0062	0.1061	0.0240	0.0700	0.0706	0.0438	0.0384	0.0406	0.0667	0.0780	0.2262	0.0689
Standard Deviation	0.1673	0.1839	0.1341	0.1747	0.1363	0.2092	0.1220	0.0917	0.1282	0.1825	0.6131	
Less Competitive												
Mean	0.0573	0.0334	0.0231	-0.0024	0.0040	0.0199	0.0294	0.0230	0.0381	0.0430	0.0137	0.0257
Standard Deviation	0.2030	0.1385	0.1696	0.1054	0.1000	0.0972	0.0976	0.1316	0.1203	0.2371	0.1931	
Competitive												
Mean	0.0656	0.0508	0.0210	0.0264	0.0097	0.0158	0.0228	0.0151	0.0192	0.0217	0.0003	0.0244
Standard Deviation	0.2670	0.1436	0.0894	0.1620	0.1337	0.1504	0.1024	0.0970	0.1694	0.1634	0.1798	
Very Competitive												
Mean	0.0512	0.0355	-0.0485	0.0295	0.0111	-0.0048	-0.0056	-0.0035	0.0096	0.0179	0.0052	0.0089
Standard Deviation	0.2163	0.1546	1.0842	0.0938	0.0696	0.0614	0.0768	0.0423	0.0766	0.1072	0.0638	
Highly Competitive												
Mean	0.0279	0.0152	0.0061	0.0094	0.0069	-0.0142	-0.0044	-0.0015	0.0014	0.0107	0.0004	0.0053
Standard Deviation	0.0776	0.0521	0.0347	0.0456	0.0752	0.0399	0.0583	0.0470	0.0450	0.0430	0.0318	
Most Competitive												
Mean	0.0049	-0.0132	-0.0060	-0.0038	-0.0176	0.0407	-0.0020	-0.0075	0.0193	0.0179	-0.0063	0.0024
Standard Deviation	0.0416	0.0492	0.0444	0.0418	0.0514	0.2707	0.0334	0.0426	0.1251	0.0644	0.0660	
Tuition Discount												
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Unranked												
Mean	0.1638	0.1766	0.2404	0.2410	0.2245	0.2558	0.2464	0.2342	0.2703	0.2631	0.2904	0.2370
Standard Deviation	0.1684	0.1691	0.1755	0.1816	0.1466	0.1884	0.1564	0.1596	0.1700	0.1579	0.1747	
Non-Competitive												
Mean	0.1719	0.2000	0.1802	0.1651	0.1965	0.1526	0.1731	0.1637	0.1626	0.1547	0.1895	0.1736
Standard Deviation	0.2461	0.2177	0.1484	0.1553	0.2549	0.1403	0.1492	0.1463	0.1483	0.1416	0.1553	
Less Competitive												
Mean	0.2169	0.2403	0.2518	0.2505	0.2502	0.2455	0.2549	0.2473	0.2571	0.2595	0.2553	0.2481
Standard Deviation	0.1636	0.1643	0.1712	0.1671	0.1617	0.1480	0.1482	0.1454	0.1418	0.1405	0.1482	
Competitive												
Mean	0.2900	0.3198	0.3214	0.3245	0.3320	0.3300	0.3372	0.3416	0.3511	0.3553	0.3582	0.3328
Standard Deviation	0.2085	0.1728	0.1339	0.1370	0.1195	0.1217	0.1304	0.1202	0.1185	0.1243	0.1168	
Very Competitive												
Mean	0.3599	0.4043	0.3864	0.3909	0.3898	0.3972	0.3980	0.4005	0.4020	0.4050	0.4080	0.3947
Standard Deviation	0.1561	0.1801	0.1265	0.1302	0.1224	0.1266	0.1221	0.1269	0.1212	0.1188	0.1156	
Highly Competitive												
Mean	0.3462	0.3514	0.3387	0.3366	0.3271	0.3512	0.3432	0.3471	0.3504	0.3502	0.3543	0.3451
Standard Deviation	0.1581	0.1413	0.1123	0.1050	0.0964	0.1101	0.0849	0.0794	0.0831	0.0814	0.0787	
Most Competitive												
Mean	0.2803	0.2964	0.3022	0.3075	0.3174	0.3339	0.3436	0.3481	0.3508	0.3542	0.3653	0.3272
Standard Deviation	0.1597	0.1464	0.1444	0.1444	0.1530	0.1478	0.1416	0.1413	0.1395	0.1405	0.1437	

Appendix C

Descriptive Data by Region

Tuition Change	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Northeast Mean	0.0477	0.0164	0.0452	0.0555	0.0577	0.0578	0.0629	0.0608	0.0615	0.0665	0.0587	0.0537
Standard Deviation	0.0539	0.0544	0.0387	0.0389	0.0438	0.0197	0.0402	0.0171	0.0146	0.0373	0.0131	
Midwest Mean	0.0459	0.0321	0.0498	0.0612	0.0543	0.0614	0.0583	0.0577	0.0563	0.0597	0.0580	0.0541
Standard Deviation	0.0352	0.0492	0.0288	0.0426	0.0255	0.0722	0.0733	0.0364	0.0199	0.0254	0.0424	
South Mean	0.0553	0.0176	0.0544	0.0628	0.0675	0.0707	0.0693	0.0634	0.0673	0.0665	0.0648	0.0600
Standard Deviation	0.0716	0.0692	0.0386	0.0560	0.0899	0.0827	0.0467	0.0437	0.0464	0.0376	0.0605	
West Mean	0.0479	0.0336	0.0596	0.0554	0.0603	0.0293	0.0762	0.0569	0.0671	0.0667	0.0644	0.0561
Standard Deviation	0.0174	0.0417	0.0318	0.0554	0.0423	0.1259	0.0740	0.0225	0.0233	0.0297	0.0304	
Net Operating Revenues ratio												
Northeast Mean	0.2365	0.1677	0.1990	-0.0244	-0.2720	0.0604	0.1875	0.1666	0.1820	0.2521	-0.0404	0.1014
Standard Deviation	0.1853	0.1905	0.2085	0.8814	0.7388	0.4773	0.1612	0.1701	0.1509	0.2065	0.2208	
Midwest Mean	0.2338	0.1904	0.1875	-0.0561	-0.2758	0.0081	0.1700	0.1172	0.1302	0.2120	-0.0662	0.0774
Standard Deviation	0.1944	0.1680	0.2783	0.6481	2.0964	0.1871	0.1396	0.1221	0.1810	0.1698	0.4325	
South Mean	0.2249	0.1541	0.0968	0.0143	-0.2016	0.0535	0.1257	0.0835	0.1218	0.1940	-0.0676	0.0727
Standard Deviation	0.1886	0.2063	0.2441	0.5740	0.7987	0.5285	0.1398	0.1587	0.1302	0.1633	0.3207	
West Mean	0.2630	0.2278	0.1980	-0.2193	-0.4128	0.0427	0.2049	0.1413	0.1920	0.2393	0.0069	0.0804
Standard Deviation	0.2479	0.2177	0.2460	1.2407	2.0839	0.1393	0.1717	0.1556	0.1751	0.2678	0.2239	
Net Operating Revenues ratio minus Investment Gains and Losses												
Northeast Mean	0.0161	0.0007	0.0260	0.0190	-0.0258	-0.0382	0.0043	0.0060	0.0058	0.0200	0.0023	0.0033
Standard Deviation	0.2374	0.1997	0.2007	0.2387	0.1939	0.1818	0.1401	0.1972	0.1439	0.2267	0.1546	
Midwest Mean	0.0380	0.0487	0.0336	0.0252	-0.0299	-0.0457	-0.0106	-0.0325	-0.0330	-0.0110	-0.0331	-0.0046
Standard Deviation	0.1837	0.1802	0.1663	0.2483	0.2614	0.2246	0.1743	0.2025	0.3271	0.1944	0.2146	
South Mean	0.0326	0.0041	-0.0038	-0.0177	-0.0474	-0.0495	-0.0310	-0.0224	-0.0045	0.0034	-0.0180	-0.0140
Standard Deviation	0.1829	0.2164	0.1930	0.1689	0.1917	0.1961	0.1819	0.1648	0.1551	0.1966	0.1609	
West Mean	0.1233	0.0899	0.0160	0.0012	-0.0344	-0.0041	0.0049	-0.0168	0.0116	0.0446	-0.0022	0.0213
Standard Deviation	0.2113	0.1898	0.1193	0.1845	0.2239	0.1461	0.1478	0.1440	0.1500	0.2197	0.2446	
Tuition Dependency												
Northeast Mean	0.4215	0.4520	0.4298	0.5299	0.6018	0.5260	0.4581	0.4828	0.4714	0.4373	0.5802	0.4901
Standard Deviation	0.1646	0.1618	0.1778	0.2608	0.3094	0.1501	0.1751	0.1731	0.1744	0.1850	0.1664	
Midwest Mean	0.3875	0.4002	0.4022	0.5088	0.5846	0.4882	0.4337	0.4640	0.4494	0.4186	0.5421	0.4618
Standard Deviation	0.1240	0.1247	0.1372	0.2355	0.5375	0.1281	0.1377	0.1267	0.1310	0.1391	0.2669	
South Mean	0.3502	0.3756	0.3789	0.4175	0.5080	0.4076	0.3962	0.4218	0.4031	0.3777	0.4889	0.4114
Standard Deviation	0.1459	0.1372	0.1524	0.2062	0.2934	0.3307	0.1441	0.1655	0.1343	0.1381	0.1629	
West Mean	0.4038	0.4285	0.4078	0.6038	0.6711	0.4941	0.4214	0.4498	0.4211	0.4155	0.5369	0.4776
Standard Deviation	0.1564	0.1829	0.1830	0.5362	0.6615	0.1640	0.1826	0.1713	0.1679	0.1850	0.1950	
Tuition Dependency minus Investment Gains and Losses												
Northeast Mean	0.5242	0.5280	0.5059	0.5118	0.5376	0.5539	0.5437	0.5595	0.5534	0.5493	0.5608	0.5389
Standard Deviation	0.1407	0.1351	0.1580	0.1495	0.1478	0.1372	0.1471	0.1486	0.1428	0.1551	0.1476	
Midwest Mean	0.4772	0.4641	0.4638	0.4713	0.4918	0.5060	0.5141	0.5285	0.5173	0.5191	0.5288	0.4984
Standard Deviation	0.1079	0.1207	0.1184	0.1209	0.1214	0.1138	0.1236	0.1084	0.1176	0.1138	0.1240	
South Mean	0.4283	0.4320	0.4173	0.4266	0.4512	0.4544	0.4584	0.4599	0.4547	0.4546	0.4689	0.4460
Standard Deviation	0.1398	0.1249	0.1349	0.1349	0.1320	0.1347	0.1368	0.1353	0.1291	0.1281	0.1268	
West Mean	0.4813	0.4986	0.4959	0.4892	0.5215	0.5156	0.5142	0.5235	0.5086	0.5186	0.5323	0.5090
Standard Deviation	0.1414	0.1659	0.1467	0.1605	0.1730	0.1540	0.1642	0.1631	0.1621	0.1768	0.1797	

Appendix C

Descriptive Data by Region continued

Reserve Ratio	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1998-2008**
Northeast Mean	1.6046	1.6223	1.6595	1.5168	1.3558	1.3442	1.4101	1.4465	1.5241	1.6455	1.5330	1.5148
Standard Deviation	1.1986	1.1981	1.2738	1.1944	1.0398	1.0224	1.1091	1.1458	1.3726	1.4909	1.3802	
Midwest Mean	1.8274	1.8259	1.8685	1.6781	1.4812	1.4155	1.5371	1.5698	1.6082	1.7533	1.5953	1.6509
Standard Deviation	2.2443	2.2705	1.9958	1.9614	1.9000	1.7878	1.9770	2.0371	2.0237	2.2288	1.8753	
South Mean	1.5016	1.3447	1.4416	1.3291	1.1873	1.1408	1.1930	1.1888	1.2223	1.3283	1.2337	1.2828
Standard Deviation	1.8436	1.5976	1.4709	1.3236	1.1842	1.0966	1.1606	1.1445	1.1908	1.2974	1.2205	
West Mean	2.0900	2.1861	2.4814	2.1784	1.8358	1.7986	1.9588	1.9895	2.1388	2.3687	2.0920	2.1016
Standard Deviation	2.4722	2.7254	3.3401	2.8758	2.3363	2.2164	2.4713	2.5362	2.7005	3.0254	2.8051	
Capitalization Ratio												
Northeast Mean	0.7240	0.7101	0.7023	0.6807	0.6603	0.6529	0.6567	0.6638	0.6678	0.6768	0.6631	0.6781
Standard Deviation	0.1683	0.1737	0.1833	0.1970	0.1945	0.1879	0.1883	0.1860	0.1850	0.1805	0.1766	
Midwest Mean	0.7589	0.7530	0.7430	0.7266	0.7061	0.6906	0.7048	0.7043	0.7028	0.7014	0.6880	0.7163
Standard Deviation	0.1612	0.1597	0.1534	0.1499	0.1534	0.1510	0.1436	0.1535	0.1551	0.1638	0.1725	
South Mean	0.7857	0.7761	0.7660	0.7506	0.7186	0.7117	0.7134	0.7114	0.7104	0.7154	0.7018	0.7328
Standard Deviation	0.1586	0.1555	0.1608	0.1624	0.1797	0.1757	0.1660	0.1643	0.1644	0.1653	0.1768	
West Mean	0.6875	0.6794	0.6870	0.7139	0.6890	0.6868	0.6743	0.6553	0.6620	0.6726	0.6421	0.6773
Standard Deviation	0.2737	0.2742	0.2556	0.2173	0.2188	0.2135	0.2113	0.2063	0.2007	0.1999	0.2101	
Return on Net Asset ratio												
Northeast Mean	0.1679	0.0851	0.1280	0.0133	-0.0153	0.0448	0.1068	0.0843	0.0923	0.1539	0.0089	0.0791
Standard Deviation	0.2402	0.1057	0.2506	0.1349	0.1163	0.1904	0.0954	0.1188	0.1862	0.2664	0.1763	
Midwest Mean	0.1357	0.1252	0.0216	0.0205	-0.0060	0.0177	0.1048	0.0570	0.0735	0.1098	-0.0087	0.0592
Standard Deviation	0.1411	0.2187	0.8499	0.1110	0.1185	0.1022	0.1619	0.0798	0.1129	0.1144	0.1731	
South Mean	0.1839	0.1010	0.0279	0.0430	-0.0081	0.0140	0.0612	0.0591	0.0780	0.1251	0.0043	0.0627
Standard Deviation	0.3849	0.1740	0.8136	0.2636	0.1089	0.1084	0.0936	0.1812	0.1241	0.1718	0.2640	
West Mean	0.1199	0.1053	0.0301	0.1804	0.0046	0.0994	0.1303	0.0710	0.1053	0.1272	-0.0089	0.0877
Standard Deviation	0.2859	0.2327	0.4870	0.6392	0.1746	0.3663	0.1623	0.0888	0.0935	0.1370	0.1557	
Return on Net Asset ratio minus Investment Gains and Losses												
Northeast Mean	0.0599	0.0188	0.0457	0.0209	0.0049	0.0210	0.0265	0.0234	0.0214	0.0408	0.0158	0.0272
Standard Deviation	0.2466	0.1016	0.2265	0.1308	0.1278	0.1932	0.0979	0.1178	0.1889	0.2461	0.1711	
Midwest Mean	0.0456	0.0648	-0.0326	0.0224	0.0161	0.0035	0.0332	0.0092	0.0186	0.0156	0.0003	0.0179
Standard Deviation	0.1896	0.2133	0.8260	0.1009	0.1128	0.0961	0.1620	0.0828	0.1151	0.1072	0.1763	
South Mean	0.0670	0.0478	-0.0363	0.0173	0.0053	0.0012	-0.0015	0.0157	0.0292	0.0366	0.0118	0.0177
Standard Deviation	0.2674	0.1738	0.7617	0.1404	0.1001	0.1128	0.1011	0.1815	0.1237	0.1765	0.2548	
West Mean	0.0449	0.0405	-0.0493	0.1696	0.0215	0.0836	0.0539	0.0185	0.0381	0.0377	-0.0055	0.0412
Standard Deviation	0.3008	0.1989	0.4651	0.5566	0.1666	0.3657	0.1730	0.0815	0.0858	0.1197	0.1483	
Tuition Discount												
Northeast Mean	0.2879	0.3010	0.3020	0.3087	0.3054	0.3136	0.3170	0.3170	0.3196	0.3230	0.3255	0.3110
Standard Deviation	0.1576	0.1496	0.1369	0.1338	0.1261	0.1266	0.1281	0.1262	0.1243	0.1287	0.1207	
Midwest Mean	0.3245	0.3394	0.3405	0.3486	0.3514	0.3639	0.3611	0.3630	0.3755	0.3798	0.3835	0.3574
Standard Deviation	0.1858	0.1709	0.1401	0.1381	0.1326	0.1431	0.1323	0.1339	0.1285	0.1253	0.1219	
South Mean	0.2443	0.2913	0.2957	0.2865	0.2945	0.2863	0.2942	0.2955	0.3072	0.3062	0.3155	0.2925
Standard Deviation	0.2178	0.2106	0.1715	0.1709	0.1684	0.1590	0.1606	0.1575	0.1554	0.1558	0.1616	
West Mean	0.2587	0.2824	0.2905	0.2969	0.2800	0.2975	0.3110	0.2985	0.3013	0.3011	0.3033	0.2928
Standard Deviation	0.1605	0.1661	0.1224	0.1601	0.1214	0.1143	0.1057	0.1060	0.1026	0.1032	0.1009	

Appendix D Supplemental Demographic Data

	total expenses			*total revenues and investment return*		
Year	*Mean*	*Median*	*Standard Deviation*	*Mean*	*Median*	*Standard Deviation*
1998	23,535,134	16,333,875	19,796,478	36,478,581	20,933,281	42,506,919
1999	24,018,223	17,364,712	22,025,661	33,260,958	20,948,430	37,417,565
2000	26,701,690	18,505,671	22,629,094	39,450,964	21,762,907	59,799,658
2001	28,602,182	20,597,044	24,179,627	26,719,911	19,097,780	27,245,199
2002	30,301,304	21,480,852	25,783,938	25,504,430	19,085,468	21,820,283
2003	31,619,338	22,259,412	26,743,938	32,070,054	22,452,898	28,246,852
2004	32,979,603	23,375,757	27,829,969	44,654,863	26,842,188	48,939,926
2005	34,493,218	24,964,102	29,068,507	42,824,893	26,822,590	45,042,733
2006	36,220,230	25,399,890	30,832,590	48,164,977	29,771,719	52,424,935
2007	38,128,268	26,973,551	32,688,011	60,363,198	33,777,751	76,006,359
2008	40,394,171	28,299,919	34,617,534	39,435,387	27,995,816	38,514,952

	total investment return			*enrollment*		
Year	*Mean*	*Median*	*Standard Deviation*	*Mean*	*Median*	*Standard Deviation*
1998	12,097,840	2,934,618	26,757,523	1,350	1,192	815
1999	7,352,504	2,047,493	20,659,678	1,366	1,214	823
2000	12,044,283	1,491,212	43,387,875	1,379	1,232	836
2001	(1,774,743)	20,810	17,390,557	1,409	1,265	842
2002	(3,531,219)	(703,703)	13,559,178	1,435	1,278	867
2003	2,235,880	404,393	8,747,337	1,435	1,278	867
2004	12,229,055	2,489,450	26,816,009	1,478	1,298	908
2005	9,514,263	1,832,754	23,202,185	1,493	1,318	918
2006	12,181,676	2,345,323	28,762,194	1,510	1,316	937
2007	21,260,527	4,169,028	49,902,240	1,527	1,342	961
2008	(529,436)	(281,103)	15,032,378	1,548	1,382	988

Appendix E Variance Inflation Factors and Tolerance Scores

Variable	VIF	Tolerance
COMP	2.81	0.356
VERY	2.58	0.388
DEP	2.25	0.443
LESS	2.05	0.488
HIGH	2.02	0.495
NOR	1.89	0.530
MOST	1.83	0.546
RES	1.70	0.588
NE	1.63	0.614
CAP	1.47	0.681
MW	1.43	0.698
TD	1.34	0.747
NON	1.33	0.749
WEST	1.26	0.792
PCI	1.07	0.931
RNA	1.05	0.953
Mean VIF	1.73	

Appendix F Pairwise Correlation Table

	TC	NOR	DEP	CAP	RES	RNA	TD
TC	1						
NOR	-0.0591	1					
DEP	0.0534	-0.6305	1				
CAP	-0.0286	0.1054	-0.2848	1			
RES	-0.0034	0.1107	-0.2468	0.4797	1		
RNA	-0.0563	0.1797	-0.1097	0.0496	0.0237	1	
TD	-0.0459	0.0314	-0.2779	0.1854	0.2029	-0.0459	1
PCI	-0.0513	0.1936	-0.1453	0.0168	0.0306	0.118	-0.0363
NE	-0.0286	0.0244	0.1115	-0.1057	-0.0034	0.0312	-0.02
MW	-0.0286	-0.0052	0.0319	0.024	0.0507	-0.0291	0.169
SO	0.0538	-0.0153	-0.1544	0.1037	-0.1011	-0.0163	-0.1187
WEST	-0.0008	-0.0031	0.041	-0.0558	0.0982	0.0287	-0.0461
HIGH	-0.011	0.0278	-0.0602	0.1593	0.2983	0.0095	0.084
LESS	-0.0197	-0.0395	0.0551	-0.1622	-0.1892	-0.0034	-0.1689
MOST	-0.0042	0.0474	-0.161	0.1624	0.3507	0.018	0.0208
NON	-0.0053	-0.0072	-0.0004	0.0094	-0.0765	0.013	-0.1543
VERY	-0.0079	0.0306	-0.0689	0.1651	0.1129	-0.0195	0.22
COMP	0.0078	-0.0124	0.093	-0.0666	-0.1582	-0.0191	0.0622
	PCI	**NE**	**MW**	**SO**	**WEST**	**HIGH**	**LESS**
PCI	1						
NE	0.1141	1					
MW	-0.1224	-0.3867	1				
SO	-0.0046	-0.4336	-0.5031	1			
WEST	0.0347	-0.1698	-0.1971	-0.2209	1		
HIGH	0.0092	0.1135	-0.0142	-0.1467	0.103	1	
LESS	-0.0158	-0.0092	-0.0789	0.1343	-0.0887	-0.1399	1
MOST	0.0492	0.2242	-0.1218	-0.127	0.0748	-0.0757	-0.1015
NON	0.0138	-0.1127	-0.012	0.1118	0.0025	-0.067	-0.0898
VERY	-0.0074	0.0222	0.0794	-0.0852	-0.02	-0.1636	-0.2193
COMP	-0.0113	-0.1008	0.1029	0.0424	-0.0897	-0.2298	-0.3079
	MOST	**NON**	**VERY**	**COMP**			
MOST	1						
NON	-0.0486	1					
VERY	-0.1187	-0.105	1				
COMP	-0.1667	-0.1475	-0.3602	1			

Appendix G Results of Regression Analyses for the Pooled, COMP, and VERY Models

Variable	Pooled Model	Pooled Model without COMP variable	Pooled Model without VERY variable
NOR	-.0031307 (-1.38)	-.0033084 (-1.46)	-.003194 (-1.40)
DEP	.0067014 (1.19)	.0060808 (1.09)	.0065262 (1.16)
RES	.0009749 (1.75)	.0009582 (1.72)	.0009205 (1.66)
CAP	-.009947 (-1.97)*	-.0105973 (-2.11)*	-.010707 (-2.15)*
RNA	-.010118 (-3.08)**	-.0100029 (-3.04)**	-.0111102 (-3.05)**
TD	-.013538 (-2.46)*	-.0146272 (-2.70)**	-.0145083 (-2.69)**
PCI	-.1162192 (-2.67)**	-.1171883 (-2.69)**	-.1164539 (-2.67)**
NON	-.0073356 (-1.74)	-.0051508 (-1.35)	-.0059188 (-1.52)
LESS	-.0080054 (-2.81)**	-.0057773 (-2.67)**	-.0065468 (-2.82)**
COMP	-.0030864 (-1.20)	N/A	-.0014922 (-0.82)
VERY	-.0025372 (-0.88)	-.0000939 (-0.05)	N/A
HIGH	-.0034197 (-0.333)	-.0010083 (-0.35)	-.0015953 (-0.56)
MOST	-.0018639 (-0.42)	.000499 (0.13)	.0000329 (0.01)
NE	-.0072417 (-3.38)**	-.0072739 (-3.40)**	-.0074649 (-3.51)**
MW	-.0068463 (-3.64)**	-.0069275 (-3.68)**	-.0069642 (-3.71)**
WEST	-.0064519 (-2.14)*	-.0061086 (-2.03)*	-.0063916 (-2.12)*
Intercept	.0771777 (13.71)	.0760106 (13.71)	.0766664 (13.69)
R-squared	0.0151	0.0148	0.0149

Notes: t values are listed in parentheses below the variable coefficients. *p<.05, **p<.01.

Appendix H Fixed Effects Models - Full, minus NOR, and minus DEP

Variable	**Fixed Effects Model**	Fixed Effects Model minus NOR	Fixed Effects Model minus DEP
NOR	**-.0053538 (-1.78)**	omitted	-.0055316 (-2.95)**
DEP	**.0006711 (0.08)**	.0130502 (2.36)*	Omitted
RES	**-.0036017 (-2.00)***	-.003892 (2.17)*	-.0035961 (-2.00)*
CAP	**-.0282097 (-2.57)****	-.0273704 (-2.49)*	-.0282664 (-2.58)*
RNA	**-.0099584 (-2.81)****	-.0104799 (-2.96)**	-.0099616 (-2.81)**
TD	**-.0158447 (-1.55)**	-.014084 (-1.38)	-.0159367 (-1.57)
PCI	**-.087847 (-1.19)**	-.0908702 (-1.98)*	-.08820 (-1.93)
NON	**-.0023713 (-0.22)**	-.0028321 (-0.26)	-.002346 (-0.21)
LESS	**.0004537 (0.05)**	-.0001019 (-0.01)	.0004827 (0.05)
COMP	**.0046803 (0.48)**	.0040211 (0.41)	.0047154 (0.48)
VERY	**.0058874 (0.58)**	.0052043 (0.51)	.0059231 (0.58)
HIGH	**.00739 (0.64)**	.0065369 (0.57)	.007294 (0.65)
MOST	**.02008 (1.34)**	.0196444 (1.31)	.0200881 (1.34)
R-squared	**0.0906**	0.0899	0.0906

Notes: t values are listed in parentheses below the variable coefficients. *p<.05, **p<.01.

Appendix I Results of Regression with IGL adjustments using the 3:1 Weighting scheme

Variable	**Fixed Effects Model**	Random Effects Model	Fixed Effects Model using cluster-robust standard errors	Random Effects Model using cluster-robust standard errors
NOR minus IGL	**-.0053523 (-0.95)**	-.0052683 (-1.16)	-.005323 (-0.48)	-.0052683 (-0.54)
DEP minus IGL	**-.00768 (-0.58)**	.0053975 (0.85)	-.00768 (-0.48)	.0053975 (0.66)
RES	**-.0039219 (-2.16)***	.0006724 (1.18)	-.0039319 (-2.08)*	.0006724 (1.34)
CAP	**-.0302915 (-2.74)****	-.0099248 (-1.94)*	-.0302915 (-2.35)*	-.0099248 (-1.96)*
RNA minus IGL	**-.0082668 (-2.04)***	-.0076998 (-2.06)*	-.0082668 (-1.82)	-.0076998 (-1.45)
TD	**-.0168177 (-1.62)**	-.0150149 (-2.66)**	-.0168177 (-1.23)	-.0150149 (-2.17)*
PCI	**-.1260695 (-2.18)****	-.1510093 (-3.53)**	-.1260695 (-2.71)*	-.1510093 (-3.33)**
NON	**-.0019139 (-0.17)**	-.0072255 (-1.71)	-.0019139 (-0.20)	-.0072255 (-1.34)
LESS	**.0009397 (0.09)**	-.0079317 (-2.78)**	.0009397 (0.17)	-.0079317 (-2.58)**
COMP	**.0052363 (0.53)**	-.0030384 (-1.17)	.0052363 (1.10)	-.003084 (-1.13)
VERY	**.0063976 (0.62)**	-.0026203 (-0.90)	.0063976 (1.03)	-.0026203 (-0.93)
HIGH	**.0072352 (0.63)**	-.0038663 (-1.09)	.0072352 (1.06)	-.0038663 (-1.32)
MOST	**.0188976 (1.25)**	-.0029701 (-0.67)	.0188976 (2.38)*	-.0029701 (-0.79)
NE	**(omitted)**	-.0069293 (-3.19)**	(omitted)	-.0069293 (-3.19)**
MW	**(omitted)**	-.0065791 (-3.46)**	(omitted)	-.0065791 (-3.52)**
WEST	**(omitted)**	-.0057098 (-1.88)	(omitted)	-.0057098 (-2.08)*
Intercept	**.0936598 (6.62)**	.078836 (13.49)	.0936598 (6.76)	.078836 (13.37)
R-squared	**0.0880**	0.0125	0.0880	0.0125

Notes: A Hausman test indicated the fixed effects model as the appropriate model for this study. Other models are listed for informational purposes. Also, t and Z values are listed in parentheses below the variable coefficients. *p<.05, **p<.01.

Appendix J Results of Regression using the 1:1 Weighting Scheme

Variable	**Fixed Effects Model**	Random Effects Model	Fixed Effects Model using cluster-robust standard errors	Random Effects Model using cluster-robust standard errors
NOR	-.0053819 (-1.61)	-.0028678 (-1.17)	-.0053819 (-0.98)	-.0028678 (-0.56)
DEP	-.00135014 (-0.14)	.0057837 (1.00)	-.0013501 (-0.15)	.0057837 (0.82)
RES	-.0044243 (-2.37)*	.0009978 (1.78)	-.0044243 (-2.29)*	.0009978 (2.43)*
CAP	-.0413656 (-3.64)**	-.0124411 (-2.45)*	-.0413656 (-2.97)**	-.0124411 (-2.37)*
RNA	-.0087514 (-2.15)*	-.0094391 (-2.54)*	-.0087514 (-2.45)*	-.0094391 (-2.75)**
TD	-.0273207 (-2.46)*	-.0156365 (-2.76)**	-.0273207 (-1.84)	-.0156365 (-2.06)*
PCI	-.0654109 (-1.27)	-.1052016 (-2.18)*	-.0654109 (-1.19)	-.1052016 (-2.08)*
NON	-.0032061 (-0.29)	-.0073417 (-1.74)	-.0032061 (-0.33)	-.0073417 (-1.36)
LESS	3.22e-06 (0.00)	-.0079629 (-2.79)**	3.22e-06 (0.00)	-.0079629 (-2.59)**
COMP	.0040745 (0.42)	-.0027504 (-1.07)	.0040745 (0.86)	-.0027504 (-1.02)
VERY	.0051741 (0.51)	-.0019975 (-0.69)	.0051741 (0.84)	-.0019975 (-0.71)
HIGH	.0063556 (0.55)	-.0029388 (-0.83)	.0063556 (0.95)	-.0029388 (-1.02)
MOST	.018605 (1.24)	-.0014883 (-0.34)	.018605 (2.30)*	-.0014883 (-0.36)
NE	(omitted)	-.0074205 (-3.45)**	(omitted)	-.0074205 (-3.64)**
MW	(omitted)	-.0067391 (-3.57)**	(omitted)	-.0067391 (-3.72)**
WEST	(omitted)	-.0066621 (-2.20)*	(omitted)	-.0066621 (-2.48)**
Intercept	.1017297 (7.59)	.0791725 (13.69)	.1017297 (8.03)	.0790725 (13.20)
R squared	0.0914	0.0138	0.0914	0.0138

Notes: A Hausman test indicated the fixed effects model as the appropriate model for this study. Other models are listed for informational purposes. Also, t and Z values are listed in parentheses below the variable coefficients. *p<.05, **p<.01.

Appendix J continued:

Results of Regression with IGL Adjustments Using the 1:1 Weighting Scheme

Variable	**Fixed Effects Model**	Random Effects Model	Fixed Effects Model using cluster-robust standard errors	Random Effects Model using cluster-robust standard errors
NOR minus IGL	-.0082687 (-1.34)	-.0079099 (-1.63)	-.0082687 (-0.70)	-.0079099 (-0.78)
DEP minus IGL	-.0055999 (-0.40)	.0061216 (0.96)	-.0055999 (-0.33)	.0061216 (0.73)
RES	-.004491 (-2.37)*	.0006404 (1.12)	-.004491 (-2.21)*	.0006404 (1.24)
CAP	-.0424749 (-3.71)**	-.0117081 (-2.27)*	-.042479 (-2.95)**	-.0117081 (-2.18)*
RNA minus IGL	-.0067828 (-1.44)	-.006657 (-1.57)	-.0067828 (-1.67)	-.006657 (-1.35)
TD	-.0283224 (-2.52)*	-.0170512 (-2.94)**	-.0283224 (-1.83)	-.0170512 (-2.33)*
PCI	-.1007392 (-2.03)*	-.1370682 (-2.91)**	-.1007392 (-1.96)*	-.1370682 (-2.80)**
NON	-.0027822 (-0.25)	-.0072313 (-1.71)	-.0027822 (-0.28)	-.0072313 (-1.34)
LESS	.000392 (0.04)	-.0079349 (-2.78)**	.000392 (0.07)	-.0079349 (-2.57)**
COMP	.0045158 (0.46)	-.0027496 (-1.06)	.0045158 (0.95)	-.0027496 (-1.02)
VERY	.0056757 (0.55)	-.0020725 (-0.71)	.0056757 (0.91)	-.0020725 (-0.73)
HIGH	.0062359 (0.54)	-.003394 (-0.96)	.0062359 (0.92)	-.003394 (-1.16)
MOST	.0175913 (1.17)	-.0025039 (-0.57)	.0175913 (2.21)*	-.0025039 (-0.66)
NE	(omitted)	-.0071554 (-3.29)**	(omitted)	-.0071554 (-3.27)**
MW	(omitted)	-.0064894 (-3.41)**	(omitted)	-.0064894 (-3.44)**
WEST	(omitted)	-.0058919 (-1.94)*	(omitted)	-.0058919 (-2.14)*
Intercept	.1052803 (7.19)	.079531 (13.34)	.1052803 (6.66)	.079531 (12.38)
R squared	0.0901	0.0127	0.0901	0.0127

Notes: A Hausman test indicated the fixed effects model as the appropriate model for this study. Other models are listed for informational purposes. Also, t and Z values are listed in parentheses below the variable coefficients. *p<.05, **p<.01.

VITA

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