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The Price of Independence: Tuition, Annual Giving, Endowments, and Financial Aid in Independent Schools

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The Price of Independence:

Tuition, Annual Giving, Endowments, and Financial Aid in Independent Schools

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Education

by

William Lee Walton, Jr.

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ABSTRACT OF THE DISSERTATION

The Price of Independence: Tuition, Annual Giving, Endowments,

and Financial Aid in Independent Schools

by

William Lee Walton, Jr.

Doctor of Education

University of California, Los Angeles, 2014

Professor Kevin Eagan, Co-Chair

Professor Eugene Tucker, Co-Chair

This quantitative study draws on 11 years worth of longitudinal financial data collected from United States independent schools from 2003 to 2013 by the National Association of Independent Schools via StatsOnline. Tuition price and tuition growth rates were analyzed by school type, proportion of students on financial aid, the ratio of total annual giving to total income and the ratio of total endowment to total annual giving. Additionally, the proportion of students on financial aid was analyzed by school type, ratio of total annual giving to total income, ratio of total endowment to total income and tuition price. The relationship between total endowment and annual giving and total endowment and tuition price was also analyzed. Findings include the most expensive type of school, the relationship between annual giving and financial aid, suggestions for independent school praxis and also suggestions further research. Because the data used includes the years 2008-2010, observations regarding independent school response to the United States recession of 2009 are also included.

The dissertation of William Lee Walton, Jr. is approved.

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2014

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VITA

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CHAPTER 1. PROBLEM STATEMENT

> Great schools have always had a base of middle class kids, and that base is important to the faculty, and that diversity is important to the school. In fact, it's surprising how many of the leadership positions and awards in independent schools are garnered by middle class kids, fueled by ambition and drive. We want demand from a socioeconomic cross-section of the population to achieve our mission, but our pricing policies are undermining that possibility.
>
> —Patrick Bassett, past president of the National Association of Independent Schools

Private schools, like private colleges, have occupied an important place in American history since the founding of Harvard College in 1636. At the Pre-K-12 level, about ten percent of the nation's school-age children are currently enrolled in about 34,000 private schools (National Center for Education Statistics, 2010).

Since 1980 tuition at independent schools has more than doubled while the U. S. median income has grown by less than 25% during the same time period. Independent schools are largely tuition-driven and derive an average of three-quarters of their revenue from tuition (McGovern & Rhoden, 2012). As tuition has increased while household incomes have remained stagnant, Patrick Bassett, immediate past president of the National Association of Independent Schools (NAIS), notes that independent schools are "quickly losing the middle class *and* the upper middle class" (Bassett, 2009, p. v.). Bassett sees the eternally rising tuition as a self-inflicted crisis: "we have redefined luxuries as necessities, spent too much, saved too little, and borrowed breathlessly against the future" (Bassett, 2009, p. v.)

A handful of independent schools boast endowments in the hundreds of millions of dollars. At these levels, significant investment income can be generated that feeds sizable financial aid funds, which, in turn, can be used to ensure moderate tuition prices so that an independent

education is available to students from diverse walks of life[1]. But the *average* endowment for an NAIS member school is only $20 million, which is hardly large enough to generate significant annual investment income. Schools such as Phillips Exeter Academy, which has an endowment of $1.08 billion (Phillips Exeter Academy, 2013), are the exception, not the norm. If independent schools want to continue serving student bodies that are reasonable cross sections of America's population, then it is essential that schools redefine their tuition-heavy financial models. Doing so would make the schools more financially sustainable in that they would be less reliant on tuition as a major source of their revenue and could thus afford to moderate their tuition price.

The above logic represents contemporary thinking on what's needed for independent schools to be financially sustainable in the 21st century. The beginning point is the very nature and use of a school's endowment. In order to better understand what's feasible and what's not feasible when it comes to advocating for changes in a school's financial model, one has to fully understand the current state of independent schools when it comes to endowments, tuition price, and financial aid.

My study will endeavor to develop a more intricate understanding of the interplay of endowment, tuition price and financial aid practices of the private schools that are members of the National Association of Independent Schools (NAIS). In addition to advocating for independent schools, NAIS provides necessary research and guidance for many issues common to independent schools, including diversity, finance, and governance. In 1994, NAIS published *Access and Affordability: Strategic Financial Perspectives for Independent Schools,* which more-or-less viewed affordability through the same lens that many private colleges have

[1] Philips Exeter Academy, established in 1781, has an endowment in excess of $1 billion. The average financial aid award at Exeter is $36,092 (tuition is $41,800) and almost half of Exeter's students receive financial aid. "Exeter provides full financial aid to any family with an annual income of less than $75,000." (Understanding Exeter's Finances, 2013, exeter.edu).

historically viewed affordability: how can an independent education be made available to minorities and lower-income students? Times have changed, though, and issues of affordability are now directly related to the very survival of independent schools since, as the reader will see, even affluent families are finding the price of an independent education difficult to pay in full.

Independent schools in America represent a broad cross section of schools that extend well beyond the typical few dozen "elite" New England boarding schools frequented by children of those in the Social Register (Baltzell, 1958; Gatzambide-Fernandez, 2009). Independent schools serve a large section of America's middle class while working to maintain racial, socio-economic, and ethnic diversity. As tuition prices have risen, independent school families are finding it increasingly difficult to afford tuition. A decade ago, day school tuition represented just 30.9 percent of the median family income in the United States; today day school tuition accounts for 44.5 percent of median family income (Batiste & McGovern, 2012). School and Student Services (SSS), which offers objective financial aid calculations for approximately 2,200 independent schools, calculates that the income needed to pay an annual tuition bill of $15,000 is $115,395[2]. That number rises to $162,555 for the Los Angeles area after cost of living adjustments (Mitchell, 2012, p.58) are made. For tuition at the $25,000 level, those income numbers rise to $148,088 and $211,163, respectively. Schools lacking substantial endowments will have to look beyond tuition for revenue sources. And schools that do have endowments will have to make decisions about whether or not they should increase the draw on their endowment in an attempt to help ameliorate rising tuition costs.

[2] The New York Times ("What Percent Are You?", January 14, 2012) estimates that a household income of $115,395 is in the top 16% of household incomes in the United States.

Finance models for independent schools

The financial situation for an independent school is governed by four different factors that can be pushed and pulled like competing levers[3]. They are endowment, tuition revenue, labor costs, and annual giving.

Like many non-profits, the presence or absence of an endowment, coupled with the current charitable giving climate which is influenced heavily by the current state of the economy as well as the tax code, directly impacts a school's ability to offer financial aid as well as to fund additional programs beyond those merely tied to academics and athletics. Endowments function further as a way to pass down equity from generation to generation. This has been called intergenerational equity (Tobin, 1974). A strong endowment enables an institution to project a sense of permanence. An institution can then use this sense of permanence to enhance its brand, attract donors and (potentially) help cement the school as part of the nation's permanent educational fabric.

The next factor of independent school finance is the school's tuition coupled with the school's ability to attract a client base that can afford to pay it. Demographics, reputation, brand, and history all come to play in this factor. As tuition has risen significantly over the last several decades, more and more families find that their household income levels put them in the range of financial aid eligibility.

Third, NAIS member schools, which rely heavily on faculty labor, must contend with costs that rise at a level above the rate of inflation, due to Baumol's cost disease (Baumol & Bowen, 1966; Blinder, 1992, among others). Usual calculations of inflation assume an increase in productivity; the same can't be said in education, since schools can only house so many

[3] Independent School Management (ISM) views a school's financial equilibrium as a composite of three different levers: employee compensation; hard income from tuition and investments; and student/staff ratio (Independent School Management, 2007).

customers at a given time and part of the appeal of independent education are labor-intensive low faculty to student ratios.

Fourth, many schools mount annual fundraising campaigns for what is usually called the annual fund or annual giving. The goal of this fundraising is actually to help moderate tuition and labor costs: annual funds are usually marketed as efforts to deliver faculty salaries and/or provide financial aid. Unlike investment income from endowments, this income is never guaranteed since the institution must work hard to raise dollars from often the same individuals—parents, grandparents, and alumni—year after year.

These four factors—endowments, tuition, labor costs, and annual giving—are intertwined and influence one another. As costs go up, so must tuition. If endowment income falls, then this shortfall must be made up somewhere else. Likewise, if enrollment drops, tuition revenue will fall as well. A banner year for annual giving can also paint an unrealistic picture for future years. Likewise, a shortfall in annual fundraising can create potentially unforeseen budget problems.

Substantial endowments can be excellent sources of revenue. But not every school has a robust endowment. In his 2009 article, "What makes an elite boarding school?", Gatzambide-Fernandez extended Baltzell's (1958) list of "select" 16 boarding schools to include 28 schools that have a strong history, high endowments, extensive physical plants and high SAT scores. These 28 schools have a combined endowment of $6.3 billion that averages $255 million per school (Gatzambide-Fernandez, 2009, pp. 1108–9). By comparison, in a 2011–2012 survey of 864 member schools, NAIS recorded a total combined endowment of $17.3 billion with an average of endowment of only $20 million per school (Table 1200, NAIS StatsOnline Survey, 2011–12, August 2012). For schools that lack a substantial endowment—and there are many—an important question to consider when tackling the issue of long-term financial sustainability is

how many resources, if any, should be devoted to building an endowment, especially since the annual draw on an endowment is only about 5% of its total. It's also important to understand what the endowment distribution among NAIS member schools actually is—aggregate data can only paint a broad picture. A better understanding of endowments can also provide a better starting point for future research on independent school financial practices. And since there appears to be some correlation between a lowering of tax rates and reduced charitable giving (Drezner, 2006), the current tax climate adds to uncertainty on how much one can rely on perennial charitable donations to their annual funds.

Comparisons between NAIS member schools and private colleges are particularly apt since both types of institutions operate using similar structures of government; they pull from similar demographics and they aspire to remain accessible and affordable to as large a cross-section of the American population as possible. At the same time, both groups of institutions have seen tuition rates rise dramatically—from 1981 to 2011, the average tuition rates of colleges, in constant 2010 dollars, have more than doubled from $7,759 to $18,133 (National Center for Education Statistics, 2012). Over the same period, day school tuition at independent schools more than doubled, moving from "about $8,000 in 1980 to about $17,000 in 2005" (Looney, 2009, p. 64). For private colleges, the rise has been even greater; from 1992–93 to 2011–12, published total tuition, including room, board and fees, at private colleges has risen from $24,500 to $38,510 (College Board, Trends in College Pricing, 2012).

As tuition has risen at rates well above inflation, family income has risen much more slowly. For instance, the median income in the United States grew in constant dollars from $42,429 in 1980 to $50,233 in 2007 (U. S. Census Bureau, Current Population Reports, 2007). Thus, affordability for independent schools is a very real issue, especially when one considers that

unlike their higher education counterparts, independent school families cannot tap federal loan and grant programs for assistance. Independent schools also face competition from public and charter schools that charge no tuition. Given that the vast majority of independent schools are tuition-driven[4], schools need to move beyond merely jury-rigging ways to *stay* affordable and actively engineer ways to dramatically improve their revenue structure. Patrick Bassett echoes this idea, "NAIS will be encouraging schools to seek to be not the price leader but the value leader in the market. The wrong question at budget time is, 'How much can we charge?' The effective question is, 'How can we offer excellence while moderating price?" (Bassett, 2009, p. vi.) One might even wonder whether or not Bassett's questions can be answered without rethinking the independent school financial model. Still, one wonders just how much independent schools have actually been working to moderate price in the last 11 years and whether or not any effort to moderate tuition price can be correlated (either positively or negatively) with the size of a school's endowment.

Independent Schools and the "Great Recession"

Economic downturns can exacerbate a school's financial situation. A 2012 study conducted by two graduate students at Vanderbilt University looked at the response of NAIS member schools to the economic downturn known as the "Great Recession" that began in 2007 and lasted through 2009 (Rush & Gilmore, 2012). Rush and Gilmore's study has many positive findings, including that schools responded quickly to recession, adjusted planning and were able to maintain programming and financial goals (Rush & Gilmore, 2012, p. 8). One of the areas of future study that Rush and Gilmore suggest is the "life cycle" of independent schools: what lessons might be important for schools "entering their 30s or 40s" compared to those "who have

[4] For example, even though The McCallie School in Chattanooga, Tennessee (founded 1905) boasts of a $65 million endowment, tuition and fees accounted for 81.5% of its revenue for the 2010 fiscal year (McCallie's IRS 990, 2011, retrieved from guidestar.org)

existed for one hundred years or only for a few." (Rush & Gilmore, 2012, p. 120). Simply put, independent schools aren't all created equal. It's important to understand independent schools from the perspective of their type—whether that type is their age, as Rush and Gilmore suggest, or that type is the ratio of the size of their total endowment to their total annual income or the ratio of total annual giving to total income[5]. My study is in this area of suggested research.

Only 37 of NAIS's member schools have been around for more than 200 years. If the rest of NAIS's schools desire such longevity, they will need to find ways to establish an intergenerational foothold. For instance, schools might wonder if it is too late to start an endowment or if an endowment is even a crucial element of the sustainability equation. Concerns of revenue-generation and cost control extend beyond the independent school world. Former Harvard CFO Allen Proctor advises nonprofits that while endowments often garner much attention on the part of boards and donors, endowments do not provide nonprofit organizations with unrestricted cash reserves. Bassett's pronouncements, the advice of consulting firms such as Independent School Management, and even Proctor's suggestions expose the rather overly *anecdotal* nature of independent school finance advice and analysis.

DiMaggio and Powell (1983) point out that the presence of professional organizations and advocacy groups can lead to "policies and structures (being) copied throughout their fields" (DiMaggio & Powell, 1983, p. 153). For them, one of the causes of institutional isomorphism is normative processes that stem from interaction with professional organizations and a professionalization of bureaucracy in a given field. In addition to normative processes, DiMaggio and Powell also identity mimetic practices that stem from uncertainty in an organization or its larger environment. The current financial milieu which independent schools find themselves

[5] My study hinges on ratios such as these.

confronting is uncertain at best. Both universities and independent schools now have gifts officers of all sorts—major, minor, capital, annual—and alumni offices geared at establishing and maintaining contact with alumni for fund raising. The professionalization of the development field in education is an example the normative pressures to which DiMaggio and Powell refer. The current economic and intellectual conjuncture for independent schools appears to be ripe for institutional isomorphism.

Research Questions

My research questions center on better understanding the relationship between tuition price, endowment, annual giving and the proportion of students on financial aid. The thrust of my problem statement has been that a school's endowment and annual giving are the starting points for virtually all discussions surrounding its financial health. Thus, my research questions seek to interrogate this notion.

1. What are (i) the average tuition price and (ii) the year-to-year and overall average tuition growth rates from 2003 to 2013 for NAIS schools? How do these overall growth rates compare to growth rates for tuition when schools are categorized in each of the following ways: by type of school; type of grade levels; the percent of students receiving financial aid; the size of their endowment in relation to their total income and their amount of total annual giving in relation to their total income.
2. What is the average percentage of students receiving financial aid overall and what is the average percentage of students receiving financial aid when schools are categorized in each of the following ways: by type of school; type of grade levels; the size of their endowment in relation to their total income and their amount of total annual giving in relation to their total income.

3. What is the relationship between: (a) a school's endowment and its tuition price; (b) the ratio of a school's total endowment to its total income and tuition price; (c) a school's endowment and total annual giving; and (d) the ratio of a school's total endowment to total income and total annual giving?
4. To what extent can the can day tuition price be predicted from the size of a school's endowment, total annual giving per student and average financial aid award?

Studying the problem: Methods

Working exclusively from a dataset provided by NAIS, I will stratify the schools using the ratio of a school's endowment size to its annual revenue along quintiles. The idea of studying school along strata by type is informed by Rush and Gilmore (2012).

Following initial exploratory data analysis (Tukey, 1977), descriptive statistics and appropriate statistical analyses will be used to answer the research questions from the perspective of each strata. For the last research question, I will attempt to build a multivariable regression model.

Public Engagement

Public engagement will be accomplished in a variety of ways. First, NAIS will be provided with an executive summary of my findings as well as a copy of my dissertation. Next, I will distribute my findings and an executive summary to the individuals who participated in the interviews used to help determine which variables to request data on from NAIS. If any of these organizations or individuals would like to follow-up on my research, I will be happy to facilitate such a process.

CHAPTER 2. LITERATURE REVIEW

Tuition at independent schools has risen much faster than inflation over the last 30 years at a time when median family income has remained constant. Thirty years ago, issues of affordability and demand at independent schools centered largely on providing access to members of socio-economic minority classes; now, affordability and demand affect the entire tuition model on which most independent schools operate. Even upper-income families now find themselves eligible for financial aid. And for schools that lack substantial endowments, the stakes are even higher since they must generate most of their revenue from tuition alone.

In this chapter, I examine the history of independent schools in America through the way in which their funding models developed over the years. Following a brief history of endowments in America, I review the basics of endowment management and also their impact on independent schools. Next, I trace the development of enrollment management in independent schools as they have sought to become more inclusive during the latter part of the last century and the beginning of this one. Then I examine the influences of endowment and enrollment management on the current financial climate for independent schools. Finally, with an eye toward further research, I survey the arguments that have been made for disruptive innovations and the creation of profit centers in nonprofit education as a way to moderate tuition prices.

Education in Early America

Today's funding models for independent schools have been largely inherited from the ways American schools, both public and private, were funded in the decades immediately following the American Revolution.

In the early nineteenth century, Americans were able to access education via three different types of educational institutions: common schools, academies and venture schools. These

options, and their sources of funding, varied from town to town. For simplicity's sake, I have chosen to group these institutions based on the ways in which they obtained their funding. I am aware that one can argue about specific definitions of the aforementioned institutions, especially since their definitions have changed over the years—common schools, for instance, moved from merely providing elementary education to providing a basis for nationalization and, arguably, anti-Catholic instruction.

Many towns formed common schools, which were "publicly maintained and belonged to the community." (Goldin & Katz, 2003, p. 11). Common schools were funded at least in part by tax dollars and usually were controlled by elected officials at the town or district level (Beadie, 2008a). Because local communities did not always have the authority to levy taxes, or when tax revenue was not sufficient to fully fund a town's common school, tuition was often charged.

State financial support also extended beyond that of local common schools to privately-chartered academies which not only filled the educational gap that existed between common schools and university but also, at times, directly competed with common schools. Academies generally provided more advanced levels of education than were usually found in common schools and were usually "incorporated to ensure financial support beyond that available through tuition alone." (Tolley, 2001, p. 227).

Americans found the academy model appealing. In the decades following the Revolutionary War, over 150 academies were established in New England (Opal, 2004, p. 118). Even though academies charged tuition far greater than any tuition charged by common schools, academies viewed themselves as public institutions along the lines of "churches, courts, and colleges" (Opal, 2004, p. 450). Academies were often coeducational and founded on the principles of a

"liberal education" in an effort to educate a new citizenry of a new country (Durnin, 1968; Opal, 2004).

Without the large endowments that belonged to similar institutions back in England, America's academies usually received some form of public support. So, from the very beginning, endowments—or, rather insufficient endowments—played a major role in shaping American independent education.

> Financial problems troubled the academies from the outset. Founded before the concept of public tax support for secondary education was accepted, they struggled to maintain themselves on the somewhat precarious base of state land grants, limited help from a few towns, lotteries, private benefactions, and tuition fees. (Durrin, 1968, p. 2).

Even though academies often received some form of public funding, they almost always were founded by "private initiative" and answered to "self-perpetuating governing boards" (Durnin, p. 1). Unlike common schools, which were controlled in part by elected officials, academies maintained a high degree of autonomy from local officials.

Academies existed in both northern and southern states and a good many of them were founded by various religious groups, including the Catholic Church (Tolley, 2001). State support in excess of ten percent of an academy's revenue was not unusual: for instance, in 1825, New York State provided upwards of one-fifth of the revenue for academies and provided 15 percent of their revenue in 1850 (Leslie, 2001, p. 265). In exchange for its largess, New York State received a supply of academy-trained teachers for its common schools. In fact, by the mid-1830s, New York State actually "mandated an academy with a pedagogical department in each senatorial district" (Tolley, 2001, p. 229).

In fact, academies were incredibly successful. An oft-cited statistic comes from the 1850 U. S. census which reported there were 6,032 academies nationwide, enrolling 261,362 students and employing 12,297 teachers (Goldin & Katz, 2003, among others).

In addition to the common schools and the academies, a third type of educational apparatus, the venture school, thrived in the decades following the American Revolution. A venture school was "an unincorporated school that depended entirely on tuition and operated as the household business of an independent teacher, often in his or her home" (Beadie, 2008, p. 48). Unlike academies and common schools, venture schools sometimes specialized in one or two disciplines. Venture schools also offered instruction at times convenient to their students, in which some schools opened "as early as 5:00 A.M. and closed as late as 9:00 P.M. in order to accommodate the needs of working students" (Tolley, 2001, p. 231). Because venture schools often provided instruction in one or two select disciplines, or were run by a single instructor, it was common for venture schools to come and go, based on the demand of the local market[6]. Some venture school founders eventually incorporated their schools and turned them into academies. In so doing, the school gained additional sources of revenue beyond that of tuition and the surrounding community gained a more permanent educational institution (Tolley, 2001, p. 233).

From locally controlled common schools to independent academies run by boards of trustees to venture schools run by an individual on a proprietary basis, schooling in early America was decentralized, fragmented and competitive[7]. One way some scholars have chosen to conceptualize education during this time period is to conceive of education markets in which teaching labor flowed freely across state boarders in search of the highest compensation. Teachers at the academy and venture school level required higher levels of education than did their counterparts at common schools and thus were able to command higher level of compensation. It was not until later on in the 19th century that "state systems of free, tax-

[6] Venture schools appear to have been the forerunner of today's for-profit vocational schools. At the K-12 level, one can see vestiges of venture schools in after school programs such as karate academies and Kumon learning centers.
[7] Academies tended to enroll students beyond the local confines of the towns in which they were situated.

supported elementary and secondary schools became the norm. . . this scenario suggests that state-based education systems replaced market-based schooling" (Beadie, p. 57).

All three types of schools—academies, venture schools and common schools—charged some form of tuition. For the common schools, tuition (or rate bills) was common in the decades leading up to the Civil War. For instance, in 1825 a school district in Lima, New York received $19.32 in public funds. Teacher salaries alone that year totaled $64.00 and the remaining $44.68 was collected via rate bills applied to families whose children attended school (Beadie, 2008b, p. 115). This practice continued for decades. Even in 1848 tuition was still being used to fund Lima's schools. "Despite more than 30 years of state subsidies and local taxation in support of common schools, in other words, the availability of common schooling in Lima still depended largely on paying demand" (Beadie, 2008b, p. 118). In fact, New York State did not abolish rate bills until 1867. Rate bills persisted in New Jersey until 1871 (Goldin & Katz, 2003, p. 48). Somewhat ironically, rate bills survive to this day in the independent school world, not in the form of tuition, but in the form of annual giving which has become a fixture in budgets of many independent schools. These funds raise money each year that the school uses to help fund the "gap" between tuition and expenses. In many instances, schools advertise that annual giving raises money for faculty salaries—the rate bill survives yet today in today's independent schools as families are tapped annually for an expected contribution—to help pay for teaching labor—over and above the tuition they're already paying.

Today's independent school practice of tacking on surcharges for extra programs also descends from nineteenth century academy practice. For instance, fee schedules published by academies show that "students almost always had to pay for extra instruction in languages and

the classics or for such ornamental subjects as painting or fancy needlework" (Tolley, 2001, p. 235).

In the decades following the Civil War and as a response to secularism, especially Catholicism, non-sectarian common schools and public high schools appeared on the American landscape, writ-large. With the abolishment of rate bills, many schools enacted compulsory education laws. As public high schools began to appear, the academies began to wane, either closing or finding themselves converted to public high schools. But the financial model for today's independent school was fully formed in the academies of the early years of America's nationhood: independent schools derive their revenue from three main sources: tuition and fees; endowment income; and annual giving revenue.

From academies and venture schools to independent schools

Today's independent schools have inherited many practices from the academies of the nineteenth century. Unlike online schools or vocational schools, which are, perhaps, today's inheritors of the venture school practice, independent schools have established physical plants, Boards of Trustees and often receive revenue in excess of tuition for program support. In today's times, these revenue streams come not from state charters but from endowments and annual giving. In fact, today's revenue models for independent schools bear such strong resemblance to the revenue models of nineteenth century American academies, it is almost as if independent schools have *inherited* their models from the academies. Inheritance is always a tricky subject, as two homophonic English verbs, cern and cerne, easily illustrate. The former, to cern, means to accept an inheritance whereas the latter, cerne, means to encircle or enclose[8]. As independent schools have developed, they have continued the revenue traditions of their predecessors,

[8] For these two verbs, and the action within the argument attached to them, I am indebted to Paul Smith's (1988) crucial work, *Discerning the Subject.*

combining tuition with additional revenue streams from fundraising and endowment revenue. But with the inheritance of the past comes potentially encircling limitations as independent schools have come, more and more, to depend on the same sources of revenue: tuition, investment income, and annual funds.

Such isomorphic progression among schools is hardly surprising. Institutions frequently mimic one another, copying the traits and practices of more established institutions in an attempt to legitimize their own practices (DiMaggio & Powell, 1983). Reasons for mimicry certainly vary, but the current uncertain financial climate in which independent schools find themselves invites what DiMaggio and Powell term mimetic processes, which encourage isomorphism in climates of uncertainty. Later, in the survey of literature produced by independent school advocacy agencies such as the National Association of Independent Schools and Independent School Management, one will see elements of what DiMaggio and Powell term normative pressures.

Non Profits, Universities and Endowments

Early American academies participated in the public good by providing access to education. Independent schools continue to fulfill these needs today, which is why the IRS classifies them as 501(c)(3) public charities for tax purposes. This allows schools to invest vast sums of monies in endowments and access only a small percentage of those funds each year. Just as my discussion of the history of independent schools began with schooling in the early years of the American republic, my discussion on endowments also begins in the same era.

Benjamin Franklin provided one of the earliest instances of endowments in the early American republic. In his will he left 1,000 pounds each to Boston and Philadelphia with the stipulation that cities invest the money untouched for the first 100 years and then use the

accumulated funds for the public good. In a lecture on the responsibility of endowments in 1937, Frederick Keppel, then President of the Carnegie Corporation noted that early endowments in America were often "directed at one of two purposes: to the immediate relief of suffering, of cold, or hunger, or pain; or to the spread of current educational opportunity" (Keppel, 1937, p. 592).

As America has aged as a nation, its nonprofits dedicated to education have grown more sophisticated. Today, endowments help an institution signal permanence, the ability to endure and, in some cases, the ability to innovate. Most literature on educational endowments focuses on endowments at the university level, with Yale University's endowment garnering a lot of attention (Tobin, 1974; Swenson, 2000; among others). Since private universities and independent schools are fairly isomorphic with both types of institutions usually governed by Board of Trustees and reliant on philanthropic donations, in addition to tuition and fees, for revenue,[9] it is relevant to consider the extensive literature on university endowments.

Endowment accumulation belongs uniquely to the world of nonprofit corporations. In America most large private universities and independent schools function as nonprofits. Large companies frequently operate on a heavily leveraged basis and it is even not uncommon for private universities in other countries, such as Japan, to be "generally financed by debt" (Hansmann, 1990, p. 4). Likewise, for-profit education enterprises also use debt to fund their practices. In the corporate arena, being leveraged is commonplace. A study of 36,767 firms from 39 countries over the years 1991–2006, found that the median leverage ratio of total debt to market value of the firm was 0.20 (Fan, Titman, & Twite, 2012, p. 33). Firms in more developed

[9] Obviously, independent schools are unable to garner revenue from research in the same way that private colleges and universities do.

countries tended to leverage with mostly long-term debt; New Zealand, Norway, Sweden, United States and Canada led the sample with the highest long-term debt ratios (Fan et al., 2012, p. 33)

Corporations distribute profits to their shareholders. A corporation's goal is always to maximize profit. Nonprofit institutions do not have shareholders to whom profits are distributed; instead, their goal is to see that their mission is carried out effectively for the public good. Nonprofits must make important choices about *how* to provide their services—and to *whom*. A nonprofit must choose whether to "maximize the level of output, the quality of service or its share of a particular market" (Brooks, 2005, p. 543). Rather than funding themselves by remaining leveraged, nonprofits tend to use endowments that function in the exactly the opposite way from debt: endowments present a never-ending accumulation of capital, year after year. In fact, only a small percentage of the endowment is tapped annually for operation expenses.

James Tobin (1974) famously defined an endowment as "intergenerational equity" in which the trustees use the endowment to guard "the future against the claims of the present" (Tobin, 1974, p. 427). For Tobin, the endowment must be consumed in a way that it is both never depleted and, at the same time, able to "support the same set of activities that it is now supporting." (p. 427). It's worth noting that Tobin played an instrumental role in the development of Yale's endowment spending policy.

No matter how large an endowment may be and no matter how well it may be maintained, an important question is whether or not an endowment privileges future generations of students over today's students. The Ford Foundation, in its influential report on educational endowments in 1969, advocated for "the clear-cut objective of maximum long-term total return" (Ford Foundation, 1969, p. 5). The Ford Foundation report was issued in response to perceived gross underperformance on the part of educational endowments. They attributed such

underperformance to educational institutions managing their endowment portfolios in a way that placed "primary emphasis on avoiding losses and maximizing present income" (Ford Foundation, 1969, p. 3). In advocating for maximizing total return, the Ford Foundation foresaw a liberated view for endowment fund managers who would now be free to invest more liberally in hopes of maximizing total return while worrying less about losses from year to year.

Thus, the Ford Foundation endorsed a plan for endowment support of operations that many educational institutions use today.

> Each year transfers are made from endowment to operating funds in an aggregate amount equal to 5% of the three-year, moving-average market value of the fund—whether or not that amount if provided by interest and dividends. (Ford Foundation, 1969, p. 21)

Swenson (2000) finds that more than 90 percent of institutions set their target spending rates between four and six percent; more than half still use the five percent rate suggested by the Ford Foundation (p. 34). And in their 2011 annual study of university endowments, the National Association of College and University Business Officers (NACUBO) and Commonfund Institute found that the average effective endowment spending rate was 4.6 percent. Since 2000, this average effective rate has ranged from a low of 4.3 percent in 2008 to a high of 5.1 percent in 2003 (NACUBO-Commonfund, 2012, p. 30). The Ford Foundation's five percent message has been taken to heart by many nonprofits and remains a major aspect of endowment management.

Yale's revered endowment management accomplishes something very similar to what the Ford Foundation proposed, in terms of the final effective annual spending rate, but the spending rate is derived in a different manner:

> Under Yale's rule, spending for a given year equals 70 percent of spending in the previous year, adjusted for inflation, plus 30 percent of the long-term spending rate applied to the endowment's current market level. (Swensen, 2000, p. 30)

Yale's clever formula continually decreases the weight of an individual year's endowment value in determining the spending rate for any one year. Such "superior smoothing

characteristics," Swenson notes, "reduce the transmission of investment volatility to the operating budget, allowing pursuit of portfolio management strategies promising higher returns" (p. 31).

However, endowments are about much more than spending rates and investment management. New capital is continually required by endowments. For instance, "in the absence of new gifts over the past forty-eight years," Swenson notes in 2000, "Yale's endowment would likely total only about one-third of today's value" (p. 37). In its 2011 endowment study, NACUBO-Commonfund found that the median size of new gifts to endowments was $2.3 million (average size was $8.30 million) and that the average percentage of operating budget funded by giving was 4.2 percent (NACUBO-Commonfund, 2012, p. 40).

If maximized total return is the norm in endowment management, then one might very well wonder what immediate purposes an endowment serves. After all, "each dollar added to endowment represents a dollar less for current research or for educational services to current students or a dollar more in tuition that must be charged current students in order to provide them with the same level of services" (Hansmann, 1990, p. 9). Donald Frey (2002) points out that from 1991 to 2001 while endowment returns were close to 10 percent, universities "on average withdrew a mere 5.4 percent of endowment value" (Frey, 2002, p. 110). Frey goes on to note that had universities with the 10 largest endowments spent an extra 2.5 percentage points of their endowments, an additional $4,600 would have been available for each student enrolled at those universities (p. 110). This raises an interesting question: *are carefully managed endowments actually being used to lessen the price of tuition?* Brooks' questions about the aims of a nonprofit are pertinent here: are universities trying to maximize their output, providing education to as

many students as possible, are they trying to maximize the quality of that education or are they trying to corner the market on education?

Endowments must mean more to an institution than just an annual source of income. In fact, they carry and project significance, both real and symbolic. Endowments allow for differentiation of quality among similarly priced institutions. For instance, in the late 1990s, Swenson (2000) found that private colleges had remarkably similar tuition levels, top-quartile Carnegie classification universities had significantly larger endowments than lower quartile universities, which enables Swenson to conclude that "endowment size correlates clearly and strongly with institutional quality" (Swensen, 2000, p. 19). While such a finding is hardly stunning, the strong correlation between quality and endowment size gives institutions substantial reason to pursue large endowments, especially if they are pursuing isomorphism through mimetic processes.

It is useful at this point in the discussion to return to those two English verbs, cern (to inherit) and cerne (to enclose). An endowment provides an inheritance of accumulated capital from years past, the bulk of which is largely closed off from today's operating budget, instead offering up a heavily metered flow toward current operations while ensuring that the maximum possible return on the endowment can be reached.[10] It is as if the vast corpus of the endowment has been put into an iron cage. While endowments certainly contribute valuable monies to annual operations, it is not evident that endowments have been used to moderate the price of tuition for colleges and universities. After all, as Swenson (2000) found, those colleges with the largest endowments also

[10] If an endowment is designed to exist in perpetuity, then it is questionable whether it is even possible for the maximum possible return to ever be realized. The endowment then becomes a teleological trope without end, a never-ending accumulation of capital whose social good is always already yet to be realized, a dream forever deferred.

charged the highest tuition. This raises an interesting question about independent schools: do those schools with the largest endowments also charge the highest tuition?

While there are annual metrics on endowments for colleges, universities and nonprofit foundations, such as the NABUCO-Commonfund studies, a lot of literature does not exist on endowments of independent schools. Both NAIS and its quasi-competitor Independent School Management (ISM) publish advice books, blog articles and strategy how-to guides. In addition, other organizations, such as the Partnership for Excellence Jewish Education (PEJE) provide similar sources of advice to their member schools, often linking to articles and reports by NAIS and ISM. Membership in these organizations is far from mutually exclusive: organizations that meet the requirements of NAIS and PEJE may certainly opt to join both; ISM tends to function in a consulting role, offering workshops and producing offering standard, fixed advice. In some cases, advice from these organizations overlaps; in other areas, particularly in the areas of financial aid and tuition pricing, ISM and NAIS advice tends to diverge.

Beyond advocating for the importance of endowments, neither ISM nor NAIS provides much information about endowments. NAIS conducts an annual online survey of independent schools, called StatsOnline, in which schools are asked to input information for a variety of variables, including endowment and annual giving variables. NAIS then reports these data, in aggregate form, to its member organizations via an annual publication, *10 Markers of Success*. However, NAIS reports the data in percentile form, *by each category*. For instance, in this year's markers of success publication (January 16, 2013), NAIS reports the 25th, 50th, 75th and 90th percentile endowment values for both day and boarding schools. Similar categories are reported in similar manner. In reporting categorical data by percentiles, data are not presented for schools that might find themselves in similar stratifications. One the values of my project is that I will work with

raw NAIS StatsOnline data to create meaningful stratifications and then parse their data along these stratifications to achieve a better understanding of tuition, endowments, financial aid, annual giving and the relationship among them.

Enrollment Management

It is common knowledge that at the university and college level, many students receive a variety of financial aid—grants, work study, and loans—financed in part by the federal government. Alas, such federal assistance is not available at the K-12 level for private school tuition. Families must rely instead on financial aid grants from schools and educational loans[11]. The bulk of aid comes from the schools themselves. Independent schools must thoughtfully manage their overall enrollment picture—carefully assembling their classes from an appropriate mixture of full-pay and aid-receiving families. Just as with endowment research, most scholarly work on enrollment management—itself a recent development, dating back only a few decades—has concentrated on enrollment management at the university level.

The origins of enrollment management are often ascribed to a professor at Boston College, Jack Maguire (Coomes, 2000; Hossler, 2000) who first used the term in 1976. Other early practitioners of enrollment management included California State University at Long Beach, Northwestern and my own alma mater, Carnegie Mellon University. (Hossler, 1996, p. 66) & (Coomes, 2000, p. 12). With the emergence of enrollment management programs institutions began to look at the totality of the way in which they recruited, admitted, matriculated, and maintained students—including, especially, what kinds of students (social and racial diversity and also talent-based diversity found in athletics and the arts), rather than approaching their

[11] Loans for K-12 tuition might be surprising to some readers. In general these loans have higher interest rates than federally subsidized loans for post-secondary education. Informative websites such as http://www.privateschools.com/financialaid.phtml and https://www.salliemae.com/student-loans/private-school-loan/ discuss loan options available to families at the K-12 level.

enrollment in a piecemeal way. Still, as "campus-based financial aid has become such an important part of enrollment management strategies, (these) strategies has also become an integral part of campus financial and budgeting strategies" (Hossler, 2000, p. 78).

Federal student aid programs in the 1960s were established for the "assurance of educational opportunity;" by the mid-1970s, though, "middle-class voters were concerned that tuition rates were rising faster than they could afford and that they were also being locked out of student aid programs targeted at the poor" (Coomes, 2000, p. 10). To address these issues, Congress has regularly reauthorized the Higher Education Act of 1965, while broadening forms of support available to students, such as expanded loans and tuition-tax credits (Coomes, 2000, p. 14). In 1997, Coverdell educational savings accounts, modeled along the lines of individual retirement accounts were introduced. Generally, the federal approach to higher education in America during the last forty years has been one of providing access. Independent schools have taken this approach as well, and in the case of Coverdell education accounts, benefit from the federal approach of providing access via tax-advantaged programs. While federal aid for tuition at private schools is non-existent, families are able to make qualified withdrawals from their Coverdell educational savings accounts to pay for private school tuition (IRS, 2012).

Therefore, with the exception Coverdell accounts, the burden of K-12 tuition falls mainly on the individual families and schools. Invariably, schools must manage their enrollment by finding the right mix of full-pay and aid-receiving families, just as happens at the post-secondary level. Tuition price setting is essential in this respect. NAIS instructs its member schools that in order to remain affordable in a market, "15 percent or more of the market in your drawing area (should) earn income to pay one full tuition for a child" (Bassett, Mitchell, & National Association of Independent, 2006, p. 24). NAIS recommends using financial aid to then

subsidize between 20 and 25 percent of the students enrolled in order maintain socio-economic diversity. Moving forward, NAIS believes that in order for a school to remain affordable, it "must seek ways to significantly reduce tuition or at least moderate increases if they have any hope of attracting more families into the independent school fold" (Bassett, 2012)

Independent School Management (ISM), on the other hand, takes issue with such advice. For ISM, financial aid "exists to get the right number of students (i.e., to get full enrollment) more than to achieve a particular socioeconomic mix" (Independent School Management, 2007, p. 38). Standard ISM advice with respect to tuition pricing is to charge what it costs to educate each student to maintain steady tuition increases, "adjusted for inflation and 'sold' as part of the strategic plan" (p. 39).

If schools choose not to moderate their tuition prices, then to achieve full enrollment, they will need to offer financial aid. Very clearly, financial aid constitutes first and foremost a cut in revenue that must be made up in some way. Schools with substantial endowments can use endowment income to make up the revenue gap caused by financial aid awards. Another approach schools use is an annual fund. Each academic year, parents, grandparents and alumni are asked to fund what is often termed "the gap" between tuition and the actual cost of education[12]. Usually annual funds are described as funding faculty salaries or financial aid or both faculty salaries and financial aid. Either description is accurate. ISM, perhaps not surprisingly, disagrees arduously with this practice, telling schools to raise funds for "enhancements" and not to "fill the gap between tuition income and your operating budget" (Independent School Management, 2007, p. 74).

[12] For instance, Chadwick School notes that its annual fund constitutes "unrestricted gifts to operations" and accounts for "about 7 percent of the school's operating budget every year" (Chadwick School, 2013)

A picture of the typical revenue structure of an independent school is thus created: tuition and fees, endowment income and annual fund revenue. NAIS and ISM disagree over the use of the last revenue source. Today's revenue structure for independent schools is indeed almost identical to the revenue streams that fed American academies in the early 19th century.

Financial Equilibrium and Sustainability

One area in which ISM and NAIS agree is in the general formula for independent school financial equilibrium. ISM uses a metaphor of three levers, each of which influences a school's financial equilibrium: salaries and benefits; hard income such as tuition, fees and endowment income; and the student/staff ratio (Independent School Management, 2007, p. 33).

Looking at these three levers, NAIS's Basset sees three possible ways forward for independent schools:

1. Competitive salaries, small classes (low student: faculty ratios), and skyrocketing tuitions
2. Non-competitive salaries, small classes, and moderately rising tuition
3. Competitive salaries, higher ratios, and stable tuition (Bassett, 2012)

Bassett endorses the last scenario since current independent school student : teacher ratios at 9.4:1 hold significant advantage of public school ratios of 17:1 (Bassett, 2012).

Again, returning to the two verbs mentioned earlier in this chapter—cern, to accept an inheritance and cerne, to enclose—independent schools, from their very early history through their status today as nonprofit corporations have inherited a rigid set of funding principles and activities that leave them little wiggle room when it comes to moderating tuition without sacrificing the product for which they are known. In addition to their inheritance of financial models, independent schools also appear to be engaged in tendencies toward institutional isomorphism outlined by DiMaggio and Powell (1983). Through mimesis, schools become more and more isomorphic to the nation's oldest and most storied independent schools even though

they do not necessarily have the same access to wealth and history that the elite schools can claim. The professional advice offered by NAIS and ISM promote isomorphism through normative pressures.

ISM underscores the limited options available by noting that independent schools can "compete on the basis of product, process, or price, but not on the basis of all three at the same time" (Independent School Management, 2007, p. 19). For ISM, product-driven schools seek to be the best academic choice in their market area. Process-driven schools also deliver sound product by attempting to deliver superior unique educational programs and approaches, marked by low staff-student ratios. Finally, schools that compete on the basis of price will engage in meaningful trade-offs in terms of product and process in order to obtain a comparative advantage. ISM is upfront about the implications of the first two practices, noting ominously that schools who market themselves as "best product" must "accept the fact that (their) school will be expensive." And "best process" schools must "accept the fact that (their) school will be even more expensive than 'best product' schools" (Independent School Management, 2007, p. 21). Again, there does not appear to be much wiggle room for a school—quality, in terms of educational outcomes and pedagogical practices, something which Americans value in every educational space—requires substantial cost.

Both NAIS and ISM would readily agree that the size of a school's endowment plays a major factor in a school's financial equilibrium. But financial equilibrium is different from moderation of tuition prices. For instance, it is not clear that schools with large endowments use those endowments to moderate their prices, in line with what NAIS suggests is necessary for future financial sustainability. In fact, it may well be that schools with large endowments steadily increase their tuition, above the cost of inflation, year after year, as ISM suggests is necessary,

choosing instead to use their largess to provide for financial aid. One aspect of my study will be to learn the extent to which schools are engaged in moderating their tuition prices and whether or not a school's tuition price growth is correlated (either positively or negatively) with its endowment size. After all, American society in the 21st century seems to experience a cacophony of prophetic siren calls in many aspects of life while institutions and people seem to carry on with their practices while politely ignoring calls to change. The current on-going budget morass at the Federal and state levels exemplifies this practice. My research aims to understand the degree to which independent schools are concerned about their tuition prices rising by looking at their actual tuition prices over the last eleven years in relation to their endowment size and level of financial aid.

Disruptive Innovation

My research will have implications for future research. One area of future research will be what changes can be made to the independent school financial model. One way in which costs have been moderated for consumers in the business world is via what Clayton Christensen has termed disruptive innovation. A professor at Harvard's Business School, Christensen has become something of a celebrity in the wake of his work on disruptive innovation and was even profiled in *The New Yorker* (May 14, 2012). In addition to his considerable work on businesses, Christensen has begun to look for disruptive innovations in the education sector. With Henry Eyring, he authored *The Innovative University* in 2011. The same year, he also helped author a report, *Disrupting College: How Disruptive Innovation Can Deliver Quality and Affordability to Postsecondary Education* for the Center for American Progress and Innosight Institute.

Disruptive innovations disrupt "bigger-and-better cycle by bringing to market a product or service that is not as good as the best traditional offerings but is more affordable and easier to

use" (Christensen & Eyring, 2011, p. 23). Within the realm of education, online education clearly offers a disruptive innovation: its low costs and ease of access allow non-traditional students access to accredited courses. The University of Phoenix has been at the forefront of online education, beginning their online classes in 1989. In the online world, instructors—not tenured professors—are hired "only when a class is likely to have enough students to generate an operating profit" (Christensen & Eyring, 2011, p. 205). Costs and quality may be lower but the number of consumers is greater.

Christensen and Eyring (2011) pay particular attention to BYU-Idaho (née Ricks College) as a bricks-and-mortar institution undergoing innovative change. Focused entirely on teaching and without a tenure system, BYU-Idaho blends online and in person learning with a year-round calendar. True to Christensen's recipe for disruptive innovation, BYU-Idaho offers a lesser quality product at a price affordable to a greater number of consumers.

Christensen cautions against conflating the term disruptive innovation with breakthrough innovations, noting that a disruptive innovation "replaces the original, complicated, expensive product with something that is much more affordable and simple that a new population of customers" can now afford (Christensen, Horn, Caldera, & Soares, 2011, pp. 13-14).

Make no mistake: disruptive innovations work because they bring lesser-quality products to a new pool of customers. This, though, is not exactly the situation that independent schools face: their rising tuitions make it difficult for their current pool of customers to afford tuition. After all, "mainstream customers are reluctant and unwilling to use a disruptive product in applications they know and understand" (Bower & Christensen, 1995, p. 45).

Whether or not independent schools will be successful in incorporating disruptive innovations into their practice remains to be seen. Already there are online private schools, such

as Laurel Springs School (www.laurelsprings.com), that cater to the growing home schooling market[13]. It is conceivable to imagine that established independent schools could offer some form of online curriculum to homeschooled students at a price substantially lower than the tuition they charge students who attend their schools daily. Such a move would not only be a form of disruptive innovation but it would also mesh well with the advice of Allen J. Proctor, former CFO of Harvard University.

Proctor believes that nonprofits must operate profitably if they are going to remain sustainable. Nonprofits that fail to turn a profit on services will fail. Proctor notes that a viable nonprofit "usually makes its ends meet by offering some services that do not fully pay for themselves (unprofitable services) and some services that bring in more money than they cost (profitable services)" (Proctor, 2010, Kindle Locations 792-794). Among the many examples Proctor cites is the golf course owned and operated by the Columbus Zoo. While the golf course (www.safarigc.com) is tangential to the mission of the zoo, it is certainly capable of bringing in profits that, in turn, can be used to subsidize the zoo's mission.

Proctor's advice hasn't fallen on deaf ears in the independent school community. John Farber, head of a school in Ohio, sketches out a vision for the future built on Proctor's advice:

> We need to look at our schools as two businesses operating under one roof. One business will be totally mission driven—educating our students in ways that we believe will serve them best—while the second will create and run profitable activities whose profits are then reinvested in the school (Farber, 2012).

Farber goes on to product a litany of profit generating programs in which various schools engage: drawing income from real estate holdings, expanding auxiliary programs (such as summer school, enrichment programs and even adult education), tapping the home school market, and even opening up campuses in foreign counties (Farber, 2012). Many of these

[13] In 1999 there were 850,000 homeschooled children in America. By 2007, that number had nearly doubled to 1,508,000. (National Center for Education Statistics, 2007)

examples bear, if not the imprimatur of Christensen's disruptive innovations, certainly the fingerprints of Proctor's advice to create profit centers tangentially related to a nonprofit's core mission. What is missing in this anecdotal list is a break down, based on a school's type of financial situation, of the types of programs employed. For instance, one of the schools that he lists as generating income from real estate holdings is none other than the Kamehameha Schools in Hawaii, arguably the wealthiest independent school in the United States[14]. There is a real need for substantial research that produces a stratification of schools based on solid financial metrics and before one seeks to identify potential profit centers available to schools.

Endowments, given their ability to annually generate income, can be perceived as a panacea for nonprofits. Proctor addresses the specter of endowments head-on. In addition to pushing for the creation of profit centers in a nonprofit organization, Proctor argues that "while (the) endowment often gets the most attention in the nonprofit world, it would be better to shift the spotlight to cash reserves" (Proctor, 2010, Kindle Locations 867-868). On this point, Proctor is adamant, pointing out, as others have, that endowments place concern for the future ahead of the benefits and needs of those being served today by nonprofits. As Proctor succinctly notes, the "decision to raise an endowment is a decision to focus some current fundraising on building a nest egg—albeit a very restricted one—that is highly unlikely to support or stabilize service delivery in the next five years" (Proctor, 2010, Kindle Locations 1066-1067). Schools, then, need to think very carefully about just how much of their resources they devote to building and maintaining an endowment, especially if their financial position is precarious.

The above discussion has been included to give glimpse of the current ideas and strategies in the nonprofit and the independent school world when it comes to endowments and other forms of financial support support. Still, this discussion also further cements the notion that a school's

[14] As of June 30, 2012, Kamehameha Schools endowment was valued at $9.2 billion.

financial health always already begins with the specific nature and status of its endowment and the relation of that endowment to tuition income.

Conclusion

Proctor's point about the double-edged nature of endowment building, in which the future is privileged over the present, is a good place to close. Independent schools owe their heritage to the competitive and fractured educational landscape of the early American republic. Over the years, as academies and venture schools became today's independent schools, these institutions have both accepted their rich tradition and history while confining themselves to earning revenue in the same ways year after year: tuition and fees; endowment income; and annual fund revenue. As the independent school world has become more professionalized, mimetic practices and normative pressures have led to institutional isomorphic modeling. Unless a school has a preexisting endowment in the hundreds of millions of dollars, very real annual proceeds, at the Ford Foundation suggested 5% draw rate, will be limited. By and large, independent schools don't possess tremendous endowment reserves. The median endowment for the 2012–2013 school year for day schools is $4.9 million; the 90th percentile endowment for day schools is only $33.6 million (National Association of Independent Schools, 2013). At the Ford Foundation suggested 5% draw rate, these endowment levels produce revenues of $230,000 and $1,680,000, respectively. Depending on the size of a school's budget, these amounts may likely not be enough to substantially moderate tuition prices or fund aggressive financial aid programs. Put bluntly, the promise of the future may be very substantially at odds with what is possible in the future and what's necessary for today.

I have drawn on Paul Smith's use of the verbs *cern* and *cerne* throughout this chapter, rather than exclusively using DiMaggio and Powell's iron cage metaphor for institutional

isomorphisms for a very deliberate reason. Smith's aim in using those two verbs is to underscore the way in which the modern subject had been intellectually abstracted away from the real conditions of existence (Smith, 1988, p. xxx). Of course independent schools, and not human subjectivity, is the concern of this dissertation. Still, it is worth noting that ideas of endowments and the traditional forms of revenue have taken on lives of their own—indeed, been fetishized—when it comes to independent school financial management. Just as Smith attempted to discern(e) the subject by finding spaces for agency, I, too, hope that my work in making sense of raw NAIS data on independent school financial metrics can help illuminate more of the reality of independent school practices when it comes to revenue generation and tuition price control. I will examine what is *actually happening* at the institutional level by type rather than taking the aggregate picture for granted, or relaying on the advise and prognostications of a few. There is real need for a quantitative study that stratifies independent schools on the basis of the ratio of size of their endowment to their annual revenue and then sets about exploring the degree to which schools in those strata have (or have not) moderated tuition price, doled out financial aid and structured their endowments. My project will help play an important role in understanding the state of endowments, annual giving, financial aid and tuition in independent schools. This will create an excellent platform on which subsequent research can be done with respect to disruptive innovation and other revenue generating practices.

CHAPTER 3. METHODOLOGY

In my previous chapter, I examine the ways in which history shaped the financial practices of independent schools alongside the history of non-profit endowments and the development of endowment management practices at the university level. Today's independent schools are primarily tuition-driven. Only a few schools with large endowments[15] can generate enough endowment income that they can use to offset tuition revenue[16]. The previous chapter also discussed the competing advice that schools sometime receive from Independent School Management and the National Association of Independent School. Drawing on the work of DiMaggio and Powell (1983), I also showed that there exists a possibility for institutional isomorphism among independent schools according to mimetic processes and normative pressures identified by DiMaggio and Powell.

Research Questions

For my study I relied on the values of key variables collected annually by the National Association of Independent Schools form its member institutions in order to develop a better understanding of how tuition price, financial aid and a school's endowment size are related. I was interested in building quantitative models as opposed to unearthing anecdotal stories and advice about ways to possible alter an independent school's financial model. I also wanted measure the degree to which schools are moving toward isomorphism within specific strata. As DiMaggio and Powell (1983) point out, one of the best ways to test for the decrease in variation and diversity associated with isomorphic change would be to observe "lower standard deviations of

[15] A 2011–2012 survey of 864 of its member schools, NAIS recorded a total combined endowment of $17.3 billion with an average of endowment of only $20 million per school (Table 1200, NAIS StatsOnline Survey, 2011–12, August 2012)

[16] And yet endowments occupy a rather central role in nonprofit management, both symbolic and practical by projecting a sense of permanence and providing spendable income independent of revenue.

the values of selected indicators in a set of organizations" (DiMaggio & Powell, 1983, p. 155). My research was designed to answer the following research questions.

1. What are (i) the average tuition price (day, 5-day boarding and 7-day boarding) and (ii) the year-to-year and overall average tuition growth rates from 2003 to 2013 for NAIS schools? How do these overall growth rates compare to growth rates for tuition when schools are categorized in each of the following ways:
    a. by way of NAIS StatsOnline variable School Type (boarding, boarding-day, day-boarding and day);
    b. by way of NAIS StatsOnline variable Class Code (elementary, secondary, and both elementary and secondary);
    c. by way of stratifying schools into quintiles based on the percent of students receiving financial aid;
    d. by way of stratifying schools into quintiles based on the ratio of their total annual giving amount to their total income;
    e. and by way of stratifying schools into quintiles based on the ratio of their total endowment to their total income?
2. What is the average percentage of students receiving financial aid overall and what is the average percentage of students receiving financial aid when schools are categorized in each of the following ways:
    a. by way of NAIS StatsOnline variable School Type (boarding, boarding-day, day-boarding and day);
    b. by way of NAIS StatsOnline variable Class Code (elementary, secondary, and both elementary and secondary);

c. by way of stratifying schools into quintiles based on the percent of students receiving financial aid;
d. by way of stratifying schools into quintiles based on the ration of their total annual giving amount to their total income;
e. by way of stratifying schools into quintiles based on the ratio of their total endowment to their total income;
f. and by way of stratifying by tuition price?

3. What is the relationship between: (a) a school's endowment and its tuition price; (b) the ratio of a school's total endowment to its total income and tuition price; (c) a school's endowment and total annual giving; and (d) the ratio of a school's total endowment to total income and total annual giving?
4. To what extent do the following variables add to the prediction of day tuition price: ratio of endowment to total income; total annual giving per student (i.e., ratio of total annual giving to total enrollment); and the average financial aid award (i.e., ratio of financial aid dollars to total financial aid students)?

Population Selection Rationale

There are over 33,000 private and independent schools in the U.S. with a wide variety of governance structures, including for-profit ventures and wholly owned subsidiaries of religious organizations. Conversely, NAIS member schools each have 501(c)(3) nonprofit status, are governed by a board of trustees, and maintain a commitment to diversity in admissions[17]. By confining my study to schools that are members of NAIS, I was able to work with a population

[17] NAIS requirements for membership are delineated online at http://www.nais.org/Articles/Pages/School-Membership.aspx. It's worth noting that NAIS membership also carries with a fee based on a school's enrollment; thus not all schools that meet its requirements for membership will necessarily join NAIS, perhaps due to financial considerations or perhaps because they can receive similar services from other organizations.

of schools that share similar practices and face similar challenges when it comes to budgeting, brand management, recruiting and fund raising.

Rationale for using NAIS dataset

My initial thought had been to gather data on key financial metrics via an online survey distributed to NAIS member schools with the aid of NAIS. A survey was written and cognitive interviews were conducted with a Head of a School at a school in Brooklyn, an advancement officer at a school in Delaware and a NAIS senior researcher. The draft of the proposed survey had sections on descriptive data on the school; school's endowment and annual fund numbers; revenue; perceptions of school's endowment, financial revenue and overall financial health; perceptions of the influence of endowment on school's financial health. For quantitative variables, the survey requested data from 2008 to 2011. Following the results of the cognitive interviews, I decided to work exclusively with a preexisting dataset provided to me by NAIS that contains many of the variables I wanted to collect data using a survey, especially after learned that NAIS collects data on many variables annually from member schools but rarely does much with these data other than report descriptive statistics in aggregate. As for the few qualitative questions about perceptions, I feel that they are best answered in future research that builds on the findings produced by my research.

Rationale for Quantitative Study

I chose to do a quantitative study based on a stratified NAIS data on NAIS member schools in order to capture an accurate picture of the current state of the independent school industry with respect to my research questions because preexisting research on NAIS schools and their revenue has primarily been qualitative. For instance, *Reducing Tuition Reliance through Alternative Sources of Income* (NAIS, 2008) use case studies to examine the problem of tuition over

reliance. The large corpus of quantitative data that NAIS collects on its member schools annually has been largely not been used in preexisting research. My research questions focused on conducting exploratory data analysis of key financial metrics in an effort to understand the relationship between a school's endowment size, tuition price and financial aid and then following this exploratory analysis up with appropriate multivariable regression models. These investigations could only be accomplished with a quantitative study.

Louis Althusser (1971) defined ideology as a lived, imaginary relationship to the real conditions of existence. At the core of my research questions is the issue of two competing realities. NAIS has repeatedly warned to schools that they should work to moderate their tuition price; my quantitative analysis of 11 years worth of data will show if schools are using their endowments to lessen reliance on tuition revenue and/or moderate their tuition prices. If they're not, as I explored in the previous chapter, then their endowments would seem to be just another aspect of the endless accumulation of capital, tied to ever-rising tuitions[18].

Overview of the dataset

NAIS annually collects data from the schools it serves via "StatsOnline", an online survey in which schools report data on many variables in many categories including tuition and fees, endowment structure, faculty experience and salaries, student demographics, admission activity, and attrition. These data are self-reported, and it is not uncommon for gaps to exist in a school's data entries. Some gaps in data are certainly understandable—for instance, day schools do not respond to questions about boarding tuition—while other gaps look as if perhaps a school failed to enter data for a given year. The dataset NAIS made available to me contained 2,167 discrete

[18] It's beyond the scope of this study but it's worth noting that it may be possible to show that the precise nature of non-profit endowments is always already overdetermined in the last instance by Marx's General Law of Capitalist Accumulation.

institutions along with their responses (or lack of responses) to 30 variables, measured over the 11 years from 2003 to 2013[19]. The variables provided were:

- Total Enrollment
- Total Financial Aid Students
- Financial Aid Dollars
- Day Tuition
- 5-Day Boarding Tuition
- 7-Day Boarding tuition
- Median Teacher Salaries
- Tuition Income
- Financial Aid Reduction in Income
- Net tuition Income
- Total Income
- Professional Development Expenses
- Technology Expenses
- Total Expenses
- Parent % Participation in Annual Giving
- Parent Average Gift
- Alumni % Participation in Annual Giving
- Alumni Average Gift
- Board-Designated Endowment
- Donor-restricted Endowment
- Quasi-endowment Funds
- Other restricted Funds Invested as Endowment
- Total Endowment
- Percent of Endowment Value Transferred to Operating Budget (only for years 2006-2013)
- Applications
- Acceptances
- Boarding Attrition
- Day Attrition
- Total Capital Giving Amount
- Total Annual Giving Amount

From the above set of variables, key variables were identified which were germane the study. These key variables were Total Enrollment, Total Financial Aid Students, Financial Aid Dollars, Day Tuition, 7-Day Boarding Tuition, Total Income, Total Endowment and Total Annual

[19] NAIS only began collecting variable "Percent of Endowment Value Transferred to Operating Budget" in 2006. Thus, for this variable only, eight years worth of data, from 2006 to 2013, has been provided.

Giving. The financial variables in the key variable list were then converted to 2013 constant dollars.

In addition to the above variables, NAIS also provided me with data on the following nominal variables: School Type (Day, Day-Boarding, Boarding-Day, Boarding); Gender (boys, girls, coeducational); zip code; and Class Code (elementary, secondary, both elementary and secondary). Finally, they provided two ordinal variables: school size (enrollment under 201, from 201 to 300, from 301 to 500, from 501 to 700, above 700) and the year the school was founded. From this set of variables, the following variables were also used as essential type variables: School Type, Class Code and Gender.

Sample Selection

In working with the data set it was important to select an appropriate sample of the data in order to answer each research question; schools with too much missing data were excluded from analysis. In order to select schools for inclusion in the study, several passes of the data were made. First, only schools that provided data for School Type, Gender, and Class Code were selected for the study. Then, from this subset only schools that reported seven or more years worth of data on the key variables identified above were then selected. Dollar amounts were converted to constant 2013 dollars in order to correct for inflation.

Methods for Stratification of Schools

In places where my analysis called for stratification, I either stratified according to essential type variables, such as School Type and Class Code, or by computing new variables based on the key variables. The three new variables that were computed were the *Ratio of Total Endowment to Total Income,* the *Ratio of Total Annual Giving to Total Income* and the *Proportion of Students Receiving Financial Aid*. The first ratio has been chosen since a $20 million endowment, using

the Ford Foundation's 5% rule, generates $1 million in spendable income each year. For a school whose total income is $45 million, that $1 million in endowment income would account for only 2.2% of the school's total income. However, at a school whose total income is $5 million, that $1 million in endowment income would account for 20% of the school's total income. Endowment sizes matter, but they matter even more in relationship to a school's total income. For similar reasons, total annual giving was analyzed in a similar fashion, by taking the *ratio of total annual giving to total income*. Finally, in order to calculate the proportion of students receiving financial aid, the ratio of financial aid enrollment to total enrollment was calculated.

After computing the above ratios, in order to account for variations over time, the above ratios were averaged over the eleven years from 2003 to 2013. Because schools did not always report data for each variable for each of the eleven years, an average ratio was only generated for each school that provided data for a minimum of seven years. Finally, once these average ratios were calculated, schools were stratified by sectioning the ratios into quintiles. In choosing quintiles, each stratum was the same size. Furthermore, the middle quintile, from 40% to 60%, includes schools symmetrically distributed on either side of the median of the ratio of endowment size to total income (or, in separate stratifications, the ratio of total annual giving to total income and also the proportion of students on financial aid). Stratifying schools via quartiles would not have produced such a middle-of-the-road stratum since no quartile contains the median.

Reading data against the backdrop of the above stratifications allowed for a detailed understanding of the interplay of endowment, financial aid and tuition price.

Data Analysis Methods

Specific methods will be used to answer specific research questions. The methods used for questions one and two are similar and thus those two research questions are grouped together here. Subparts of research questions are not included in the list below.

1. What are (i) the average tuition price (day, 5-day boarding and 7-day boarding) and (ii) the year-to-year and overall average tuition growth rates from 2003 to 2013 for NAIS schools? How do these overall growth rates compare to growth rates for tuition when schools are categorized in each of the following ways: School Type; Class Code; percent of students receiving financial aid; ratio of total annual giving to total income; and the ratio of total endowment to total income.
2. What is the average percentage of students receiving financial aid overall and what is the average percentage of students receiving financial aid when schools are categorized in each of the following ways: School Type; Class Code; percent of students receiving financial aid; ratio of total annual giving to total income; the ratio of total endowment to total income; and tuition price.

In answering the first two research questions, data was reported for the given stratifications both overall, as an average from 2003 to 2013, and also for each year in the study. Additionally since the first question dealt with tuition price, analyses were performed for both day tuition and 7-day boarding tuition. When tuition prices were stratified for the computed variables as opposed to the type variables, it was discovered that the quintile stratifications were not the same for both boarding and day tuition. This is discussed in detail in the next chapter.

3. What is the relationship between: (a) a school's endowment and its tuition price; (b) the ratio of a school's total endowment to its total income and tuition price; (c) a

school's endowment and total annual giving; and (d) the ratio of a school's total endowment to total income and total annual giving.

I calculated correlations for the above four variables using different subsets of the data from 2003 to 2013. This allowed me to determine if correlations varied over time or remained more or less constant for schools throughout the eleven years. First, I ran correlations for the variables on averages from the years 2003, 2004, 2005 and 2006. Subsequent correlations were for averages calculated over the years; 2007, 2008 and 2009; 2010, 2011, and 2012; and, finally, over all the years from 2003 to 2013. By grouping years in the above manner, I was able to separate out the years that coincided with the recession of 2007–2009. I anticipated that there would be a strong positive correlation between a school's endowment and its average annual giving amount, and also a similar, although somewhat weaker, positive correlation between a school's annual giving and the ratio of its endowment to its annual income.

4. To what extent do the following variables add to the prediction of day tuition price: ratio of endowment to total income; total annual giving per student (i.e., ratio of total annual giving to total enrollment), and average financial aid award (i.e., ratio of financial aid dollars to total financial aid students)?

I conducted a multivariable regression analysis with the above variables. First, I calculated two new variables, total annual giving per student and average financial aid award. Total annual giving per student was calculated by taking the ratio of total annual giving to total enrollment; average financial aid was calculated by taking the ratio of total financial aid dollars to financial aid enrollment. As in the third research question, I used average values of a series of different years to see how well these variables predict tuition price before, during and after the recession from 2007–09. Then I performed regression analyses for the following groupings of years: 2003,

2004, 2005 and 2006; 2007, 2008 and 2009; 2010, 2011, and 2012; and, finally, over all the years from 2003 to 2013.

Ethical Issues

The data that NAIS provided to me contained proprietary information linked to specific independent schools by name. I kept this information confidential at all times. The nature of this study does involve discussion of individual schools but rather quantitative analyses of different strata of schools. This study is concerned with establishing trends of practices within specific strata of independent schools, my results was be reported as statistics and not as descriptions of specific schools, thereby ensuring institutional anonymity. Thus, no specifics particular to any individual school are revealed by this study. I have signed a confidentiality agreement with NAIS and maintained this confidentiality at all points in my quantitative investigation. In the few instances in this dissertation where individual schools are mentioned by name, the information associated with them came from publicly available documents and not from the data provided to me by NAIS.

Addressing Validity, Reliability, Credibility and Limitations

I have every reason believe in the validity, reliability and trustworthiness of my data. The NAIS StatsOnline data is self-reported annually by schools to NAIS. There is no incentive for schools to misrepresent their own individual data. As well, NAIS has a sound reputation when it comes to their research division and the data they collect and reports issued from it.

Still, there were numerous instances of missing data present in the NAIS dataset. In cleaning data I eliminated cases in which schools did not provide data for any of the three essential type variables: School Type, Class Code and Gender. Next, schools that did not provide at least seven years worth of data on for the study's key variables were excluded. After completing this

process, a little over 700 schools remained in the sample. This sample allowed me to be sure that my analyses were based on schools that had actually provided a decent amount of information. One potential limitation associated with this process is that the ultimate sample may include schools on a more solid financial footing since it's certainly possible that the schools who report data most frequently to StatsOnline are much better off financially than schools that do not report data as frequently. This, however, is pure speculation. Future researchers may want to delve deeper in this question of the nature of the types of schools that report frequently versus those schools that report infrequently.

There are limitations associated with any study. There are nontrivial limitations surrounding the data set when it comes to missing data and the possibility that data was entered incorrectly, even though institutions have no incentive to intentionally misstate their data. Additionally, there are limitations based on the *type* of this study. A quantitative study can only give a snapshot of what's happening in the independent school world when it comes to the interaction between tuition price, endowment, financial aid and annual giving. It can't give the *thinking* that goes on behind the scenes. A qualitative study that looks at the decision processes that occur behind the scenes would be the perfect complement to this study.

CHAPTER 4. FINDINGS

Over the last thirty years, tuition at independent schools has more than doubled while the U.S. median income has grown by less than 25%. Because American independent schools derive the vast majority of income from tuition, advocacy groups such as the National Association of Independent Schools (NAIS) have rightfully cautioned independent schools about the potential problems of ever-increasing tuition in an era of stagnant incomes. My study thus focused on analyzing specific trends in the tuition prices of independent schools and their relationship with key variables such as endowment, total income, total annual giving, and the proportion of students on financial aid. The goal of this work is to achieve a better understanding of just how tuition grows at different types of schools, how the percentage of students on financial aid varies by type of school, as well as the relationship between endowment, annual giving, tuition price, and proportion of financial aid students. The dataset used in this study was provided to me by NAIS and represents 11 years worth of data collected from schools via StatsOnline, a system by which schools annually self-report data on key variables to NAIS.

This 11-years' worth of data was compiled on 2,167 schools. Key demographic data on the schools is contained in the variables School Type, Class Code, and Gender Code.20 School Type identifies the type of school, whether it is boarding, day, day-boarding, or boarding-day;21 Class Code identifies the grade levels at the school, i.e., elementary, secondary, or both elementary and secondary; and, Gender Code identifies whether the school is coed, all-boys, or all-girls. Schools that failed to fit into any one of the above three variables were immediately excluded from the

[20] For the purposes of clarity, variable names will be capitalized in this chapter.
[21] For categorization purposes, NAIS defines a *boarding school* as a school that enrolls at least 95% boarding students; a *day school* similarly as 95% or more day students; a *day-boarding school* as 51% to 94% day students; and, a *boarding-day school* as 51% to 94% boarding students.

study; thus, the pool of institutions was reduced to 1,979. Originally I had planned to look at trends among three different types of tuitions charged by independent schools: five-day boarding tuition; seven-day boarding tuition and day tuition. However, no more than 66 institutions in any given year reported five-day boarding tuition, and only 14 institutions reported five-day boarding tuition for all 11 years in the study. Thus, I focused instead on answering the above research questions about seven-day boarding tuition and day tuition only. Moreover, schools didn't always report data for each of the 11 years in the study. Thus, in order to insure that a decent amount of data existed for each of the schools in the study, schools that failed to report seven or more years worth of data for the variables used in this study—tuition price, total annual giving, total income, total endowment, financial aid dollars, and financial aid enrollment numbers—were then excluded from the study. When this was done, a total of 732 schools remained. Broken down by School Type, the data set looks like this:

Table 4.1: *Schools by School Type*

	Frequency	Percent
Boarding	11	1.5
Boarding-Day	75	10.2
Day-Boarding	53	7.2
Day	593	81.0
Total	732	100.0

The goal of this research project was to gain a better understanding of tuition trends among independent schools when stratifying by School Type, Class Code, percent of students on financial aid, the ratio of annual giving to total income, and the ratio of total endowment to total income.

This chapter is organized around findings for each of the four research questions. Unless noted otherwise, statistical significance is at the 0.05 level. All dollar amounts reported are constant 2013 dollars.

Research Question 1

> What is the average tuition price (day and seven-day boarding[22]) for NAIS schools from 2003 to 2013? What are the year-to-year and overall average growth rates from 2003 to 2013? How do the average tuition prices and growth rates differ when schools are stratified by: (a) School Type; (b) Class Code; (c) quintiles based on the proportion of students on financial aid; (d) quintiles based on the ratio of total annual giving to total income; and, (e) quintiles based on the ratio of total endowment to total income?

This research question must be answered in two parts, first in terms of tuition price and secondly in terms of tuition growth rates.

Research Question 1: Tuition Prices

The first part of the research question seeks to establish an overall picture of boarding and day tuition trends from 2003 to 2013, and then breaks down schools into various strata which are helpful in understanding the extent to which tuition price is influenced by type of school, financial aid, annual giving and endowment. The overall snapshot of tuition prices is presented in Table 4.2.

[22] Henceforth "seven-day boarding tuition" will be referred to simply as "boarding tuition."

Table 4.2: *Day and Boarding Tuition, 2003-2013*

	Day tuition		*Boarding tuition*	
Year	N	Mean	N	Mean
2003	650	$18,174	120	$36,883
2004	657	19,128	124	38,106
2005	692	19,352	128	39,079
2006	687	19,807	125	39,573
2007	692	20,365	125	40,667
2008	697	21,002	125	41,819
2009	699	21,461	128	42,375
2010	698	22,460	128	44,322
2011	686	22,987	127	45,521
2012	666	23,110	121	45,853
2013	661	23,688	114	46,786

Rather unsurprisingly, boarding tuition is substantially higher than day tuition. In Table 4.2, one can see that from 2003 to 2013, boarding tuition is roughly double day tuition. In answering the five subparts of this portion of the research question, separate analyses are needed for day tuition and boarding tuition. Where possible, both boarding and day tuition data will be consolidated into single tables.

Boarding and Day Tuition as Stratified by School Type

When these schools were broken down by School Type, no more than five boarding schools in any given year reported day tuition numbers; a similar scarcity of day schools reported charging boarding tuition for any given year. Thus, for day tuition, comparisons were only made for day schools, boarding-day, and day-boarding schools. Table 4.3 below presents day tuition across these three strata.

Table 4.3: *Average day tuition, stratified by School Type, 2003–2013*

	Boarding-Day		*Day-Boarding*		*Day*	
Year	N	Mean	N	Mean	N	Mean
2003	53	$22,665	49	$19,187	546	$17,632
2004	55	23,781	49	20,023	551	18,569
2005	56	24,323	51	20,552	583	18,752
2006	53	24,747	51	20,780	581	19,254
2007	54	25,588	49	21,504	587	19,772
2008	57	26,516	50	22,004	588	20,365
2009	56	27,431	50	22,463	591	20,794
2010	58	29,089	49	23,521	589	21,702
2011	54	28,951	50	24,061	580	22,321
2012	52	28,770	47	24,358	565	22,466
2013	49	29,485	49	24,931	561	23,057

In each of the three strata, tuition grows steadily, year-to-year (growth rates will be discussed below in the Growth Rate section of this research question.) The vast majority of schools that charge day tuition are day schools. The day tuition charged at day schools is noticeably less than the day tuition charged at day-boarding and boarding-day schools. Day tuition at day-boarding averages 1.08 times day tuition at day schools; at boarding-day schools, day tuition averages 1.30 times as much as day tuition at day schools. Moreover, the differences in tuition charged at these schools, between each group, is significant, for each year from 2003 to 2013 and overall[23]. Thus, the mere presence of a boarding program causes an increase in day tuition—and as the proportion of boarding students increases, so too does day tuition.[24]

Let's turn our attention now to boarding tuition at boarding schools, boarding-day schools and day-boarding schools. There are far fewer schools charging boarding tuition than charge day

[23] Results of ANOVA and Sidak post-hoc tests included in Appendix A.
[24] While beyond the scope of this research project, it would be a worthwhile exercise to index tuition price to the actual proportion of boarding and day students.

tuition[25]. As with day tuition, the mixing of different types of students, boarding and day, has an effect on boarding tuition. If boarding tuition rose in the same way that day tuition rose along with the number of boarding students, one would expect boarding schools, as opposed to day-boarding or even boarding-day schools to have the highest boarding tuition. This, though, is not the case. Table 4.4 shows boarding tuition, stratified by boarding, boarding-day, and day-boarding schools.

Table 4.4: *Average boarding tuition, stratified by School Type, 2003–2013*

	Boarding		*Boarding-Day*		*Day-Boarding*	
Year	N	Mean	N	Mean	N	Mean
2003	11	$36,380	66	$38,003	43	$35,292
2004	11	38,278	69	39,233	44	36,295
2005	11	39,426	71	40,300	46	37,111
2006	10	39,737	69	40,867	46	37,597
2007	11	40,856	69	41,978	45	38,611
2008	9	42,382	70	43,207	46	39,596
2009	11	42,643	71	43,873	46	40,000
2010	11	44,524	72	45,634	45	42,172
2011	11	45,611	71	46,755	45	43,554
2012	10	45,649	69	47,293	42	43,536
2013	8	47,330	64	48,195	42	44,536

Just as boarding-day schools proved to be the most expensive for day-tuition, so too are boarding-day schools the most expensive when it comes to boarding tuition. For each of the years from 2003 to 2013, boarding-day schools charged the most boarding tuition, averaging almost $3,500 more than day-boarding schools and even about $1,100 more than boarding schools. From a statistically significant standpoint, the difference between boarding tuition at boarding-day schools and day-boarding schools was statistically significant overall and at each year from 2004 through 2013. However, there was no statistically significant difference between

[25] This will obviously hamper the ability to draw statistically significant inferences about boarding tuition later on.

boarding tuition charged by boarding schools and day-boarding schools or even between boarding-day and boarding schools. Analysis of variance and Sidak post-hoc test results are included in Appendix B.

Future researchers may want to consider whether schools that have a majority of day students are more susceptible to economic pressures beyond their own campus than schools that enroll a majority of boarding students since such an effect could help to explain why boarding-day schools are marginally more expensive than boarding schools.

In summary, boarding-day schools, which enroll between 50 and 95% boarding students, are the more expensive schools when it comes to tuition prices for both day and boarding students.

Boarding and Day Tuition when Stratified by Class Code

As Table 4.5 illustrates, day tuition is higher at the secondary level than at the elementary level. At schools that are both elementary and secondary, day tuition is higher than elementary schools but lower than at secondary schools. On average, from 2003 to 2013, day tuition at secondary schools was 1.29 times higher than at elementary schools. Yet the average day tuition at schools classified as both elementary and secondary was only 1.18 times as much as at elementary schools on average. This makes sense, since the higher tuition charged at the secondary level should average out with lower tuition charged at the elementary level: schools don't charge one tuition across all grades, but rather a graduated tuition price depending on a student's grade level. The differences in day tuition between schools stratified by class code are statistically significant. Analysis of variance and Sidak post-hoc test results are included in Appendix C.

Table 4.5. *Day Tuition by Class Code*

	Elementary		*Secondary*		*Both Elementary & Secondary*	
Year	N	Mean	N	Mean	N	Mean
2003	212	$16,524	88	$21,400	350	$18,362
2004	212	17,571	91	22,507	354	19,192
2005	231	17,673	93	23,048	368	19,471
2006	230	18,190	91	23,439	366	19,921
2007	231	18,648	91	24,200	370	20,494
2008	232	19,348	93	25,192	372	20,986
2009	234	19,739	93	25,806	372	21,458
2010	232	20,668	93	27,259	373	22,379
2011	230	21,226	92	27,537	364	22,949
2012	222	21,472	90	27,521	354	23,015
2013	220	22,006	89	27,913	352	23,671

When it comes to boarding tuition at the elementary schools, fewer than 16 schools per year reported boarding tuition and only five schools reported boarding tuition at the elementary level for each of the years from 2003 through 2013. Thus, boarding tuition at elementary schools will not be discussed. Table 4.6 shows boarding tuition at secondary schools and also at schools that are both elementary and secondary schools.

Table 4.6: *Average boarding tuition, stratified by Class Code, 2003–2013*

	Secondary		*Both Elementary & Secondary*	
Year	N	Mean	N	Mean
2003	78	$36,827	35	$36,387
2004	82	38,214	34	37,049
2005	84	39,288	36	37,782
2006	82	39,858	35	38,151
2007	82	40,895	35	39,395
2008	81	42,219	36	40,224
2009	84	42,906	36	40,462
2010	85	44,670	35	42,711
2011	84	45,797	35	44,085
2012	81	46,230	33	44,210
2013	74	47,333	33	44,763

Somewhat unsurprisingly, boarding tuition at secondary schools was more expensive than boarding tuition at elementary and secondary schools. In fact, on average boarding tuition at secondary schools was $1,700 more than at elementary schools. When subjected to an analysis of variance test, boarding tuition overall and across all years 2003 to 2013 was not significantly different at secondary schools than elementary and secondary schools.

Boarding and Day Tuition when Stratified by Percent of Students on Financial Aid

Schools report both their total enrollment and their total financial aid enrollment to NAIS, thus it's possible to calculate the ratio of students on financial aid for a given year. This ratio should be a number between zero and one, with zero signifying that no students receive financial aid and one corresponding to the entire student body receiving some type of financial aid. The ratio of students on financial aid was calculated for each year that schools provided data provided this ratio was between zero and one. The average ratio was then calculated for the 732 schools included in the sample selection of this study. Table 4.7 shows the cut-offs for the quintiles in this stratification.

Table 4.7: *Proportion of students on financial aid*

Minimum		0.0208
Maximum		0.9578
Percentiles	20	0.1273
	40	0.1727
	60	0.2147
	80	0.2888

The fifth quintile begins with schools that have 28.88% or more students on financial aid. The contrapositive is profound: 80% of schools provide financial aid to fewer than 28.88% of their students. Moreover, the lower 40% of the schools only offer financial aid to less than one-fifth (indeed, less than 17.27%) of their student body.

Before launching into year-by-year analyses by financial aid proportion quintiles for day and then boarding tuition, it's worth looking at Table 4.8 which shows the breakdown, by quintiles, of the overall average boarding and day tuition for the years 2003–2013.

Table 4.8: *Day and Boarding Tuition by Proportion of Students on Financial Aid*

	Day Tuition		*Boarding Tuition*	
Quintile	N	Mean	N	Mean
1	146	$19,115	8	$45,823
2	145	21,220	7	36,712
3	146	21,721	7	45,233
4	139	22,045	40	42,503
5	129	20,891	67	41,238

What stands out is how uneven the quintiles are for schools charging boarding tuition. Schools charging day tuition are spread rather evenly throughout the quintiles established above, ranging from 129 schools in the fifth quintile to 146 schools in the third quintile. But the numbers for schools charging boarding tuition are skewed to the left: a total of 23 schools are in the first three quintiles while 67 schools are in the fifth quintile. Already, one sees that schools which charge boarding tuition have a higher percentage of students on financial aid than those schools that charge day tuition.

Since the goal of this research question is to stratify schools into equal quintiles, it became evident that it made sense to stratify the schools separately by type of tuition charged and then stratify those two groups of schools separately. Thus, in answering this research question, two different stratifications for two different groups were used, one for the 705 schools charging day tuition and a separate stratification for the 129 schools charging boarding tuition. Table 4.9

shows the quintile cut-offs for schools charging day tuition when stratified by percentage of students on financial aid.

Table 4.9: *Proportion of Students Receiving Financial Aid at Schools that Charge Day Tuition*

Minimum		0.0208
Maximum		0.6830
Percentiles	20	0.1247
	40	0.1688
	60	0.2117
	80	0.2792

Predictably, the cut-offs for the quintiles are a bit lower from the cut-offs for the earlier that also included boarding schools. Before looking at these stratifications year-by-year, let's first look at the overall average day tuition from 2003–2013 when stratified along these lines. This is shown in Table 4.10. Unsurprisingly, the lowest average tuition is charged by schools in the first quintile, those schools who have less than 12.47% of their student body on financial aid. Somewhat surprising, though, is that the average tuition does not monotonically increase as one moves sequentially through the quintiles. In fact, the fifth quintile—made up of schools for which between 27.92% and 68.30% of their student body receives financial aid—is actually only the *second* most expensive quintile. The middle three quintiles are all more expensive that the fifth quintile.

Table 4.10: *Average Day Tuition by Proportion of Students Receiving Financial Aid*

Quintile	N	Mean
1	141	$18,899
2	141	21,221
3	141	21,734
4	141	22,178
5	141	20,920

An analysis of variance showed that the average tuition in the first quintile was statistically significantly lower than in the second, third and fourth quintiles. There was no other statistically significance difference among the quintiles. As above, analysis of variance and Sidak post-hoc test results are included in Appendix D.

Table 4.11 shows the tuition price trends from 2003 to 2013 for the individual quintiles discussed above. Note just how little tuition is charged by schools in the first quintile—those schools which have less than 12.47% of their students on financial aid—compared to schools in subsequent quintiles.

Table 4.11: *Day tuition, by proportion of students on financial aid, 2003–2013*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2003	133	$16,243	132	$18,441	131	$18,547	127	$19,324	127	$18,382
2004	129	17,406	132	19,374	130	19,525	136	20,086	130	19,189
2005	140	17,381	140	19,496	136	20,062	139	20,441	137	19,408
2006	140	17,899	140	20,034	135	20,619	138	20,878	134	19,643
2007	141	18,330	138	20,726	139	21,121	137	21,543	137	20,152
2008	140	18,953	139	21,407	139	21,582	140	22,267	139	20,807
2009	139	19,404	141	21,685	141	22,141	140	22,629	138	21,423
2010	140	20,252	139	22,772	141	23,101	140	23,715	138	22,459
2011	137	20,620	136	23,267	138	23,961	138	24,249	137	22,822
2012	134	20,744	135	23,413	131	24,025	137	24,314	129	23,040
2013	134	21,113	133	24,162	132	24,957	131	24,768	131	23,484

The differences between tuition in first quintile and the second, third and fourth quintiles are statistically significant. These results are alincluded in Appendix D. The tuition in the fifth quintile is the second lowest tuition, however this difference is not statistically significant. These findings continue to be surprising because they seem so counter-intuitive; to the layperson it

would seem incredible that schools in both the first *and* fifth quintiles would average less in day tuition than the middle 60% of the schools on the financial aid spectrum.

These findings are curious and warrant attention from future researchers who may wonder if schools provide that financial aid to a higher percentage of their student body also strive to keep their prices down.

One wonders if the same trends will hold for boarding tuition stratified across the quintiles established for the 129 schools that charge boarding tuition in the study. The quintile cut-offs are delineated in Table 4.12 below.

Table 4.12: *Proportion of Students Receiving Financial Aid at Schools that Charge Boarding Tuition*

Minimum		0.0427
Maximum		0.6531
Percentiles	20	0.2199
	40	0.2683
	60	0.3169
	80	0.3961

Financial aid is awarded at a much higher rate at schools with boarding programs than at schools with day programs discuss above. Whereas, in the earlier stratifications, 60% of schools provided financial assistance to fewer than 22% of their students, in this stratification more than 80% of schools with a boarding program provide financial aid to more than 22% of their students. In fact, more than 40% of schools provided financial assistance to at least 30% of their students. Boarding schools clearly provide financial aid to a greater percentage of their students.

Table 4.13 shows boarding tuition stratified according to these quintiles. One will immediately notice that a very different—and equally unexpected—phenomenon occurs here. As one move across the quintiles, the average tuition appears to decrease monotonically with the notable exception of the middle quintile in which the average tuition actually peaks.

Table 4.13: *Average Boarding Tuition by Proportion of Students Receiving Financial Aid*

Quintile	N	Mean
1	26	$42,629
2	26	42,040
3	26	43,444
4	26	41,120
5	25	40,130

Thus the most expensive quintile is the third quintile—those schools that award financial aid to between 27% and 31% of their students. The next most expensive quintile is the first quintile, the schools who award financial aid to less than 22% of their students. The lowest average tuition occurs in the fifth quintile, which contains schools that award financial aid to between 40% and 65% of their students. While these findings are curious, one hesitates to give too much valence to this phenomenon due to the extremely small sample sizes in each quintile. In fact, an one way analysis of variance test revealed no statistically significance between the quintiles. Table 4.14 shows the year-by-year averages for the aforementioned quintiles.

Table 4.14: *Boarding Tuition, by Proportion of Students on Financial Aid at Schools that Charge Boarding Tuition, 2003–2013*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2003	23	$37,635	26	$37,340	24	$38,594	24	$35,845	23	$34,910
2004	25	39,430	25	38,107	26	39,360	25	37,234	23	36,194
2005	26	39,818	25	39,218	26	40,613	26	38,516	25	37,160
2006	26	40,385	26	39,943	23	40,998	26	39,116	24	37,424
2007	26	41,414	25	40,783	24	42,045	26	40,003	24	39,078
2008	26	42,566	26	41,900	24	43,167	24	41,524	25	39,945
2009	26	43,174	26	42,240	25	44,254	26	41,648	25	40,563
2010	26	45,009	26	44,489	26	45,711	25	43,788	25	42,522
2011	26	45,873	25	45,680	25	47,852	26	44,559	25	43,667
2012	24	46,014	25	45,622	24	48,562	24	44,979	24	44,099
2013	23	47,870	23	47,003	21	48,153	24	46,255	23	44,791

The most expensive quintile is clearly the middle quintile—those schools that have between 27% and 31% of their students on financial aid. Still, this quintile isn't much more expensive that the first—the difference in means is less that $1,000 and in 2004, the average tuition in the first quartile was actually $70 more expensive than the average tuition in the third quartile. Still, the average tuitions in the first three quintiles are higher than the average tuitions in the last two quintiles; thus, schools that provide financial aid to more than 31% or more of their students also appear to moderate their tuition price somewhat as well. For instance, there is always at least a $3,000 difference in price between the third and fifth quintiles. Thus schools that provide financial aid to fewer students are more expensive when it comes to boarding tuition.

As with the overall average tuitions, though, a one way analysis of variance found no statistical significant difference between the aforementioned quintiles. Still, this does raise a provocative questions: are boarding schools that provide substantial percentages their students with financial aid also actively trying to moderate their price? Future researchers may way to see if they can either replicate or refute these observations with larger sample sizes.

Boarding and Day Tuition when Stratified by the Ratio of Total Annual Giving to Total Income

For this analysis, the ratio of Total Annual Giving to Total Income was calculated for each year from 2003 to 2013 and then averaged. Then quintile cut-offs were established for all 732 schools in the study. Table 4.15 shows these cutoffs. Note that 80% of schools earn less than 10% of their income in the form of annual giving.

Table 4.15: *Ratio of Total Annual Giving to Total Income*

Minimum		0.0023
Maximum		0.7961
Percentiles	20	0.0451
	40	0.0594
	60	0.0768
	80	0.1000

As with the analyses done above for the stratification by the proportion of students on financial aid, it's worth looking at the over breakdown of average day and boarding tuition by the above quintiles for all 732 schools, which is detailed in Table 4.16 below.

Table 4.16: *Average Day and Average Boarding Tuition by the Ratio of Total Annual Giving to Total Income*

	Day Tuition		*Boarding Tuition*	
Quintile	N	Mean	N	Mean
1	143	$17,543	13	$40,675
2	143	20,052	13	43,239
3	145	20,575	11	42,053
4	140	22,918	41	41,275
5	134	24,105	51	42,305

Tthe unevenness of the boarding schools among this stratification is obvious yet again: in the first three quintiles, which cover schools that earn less than 7.68% of their income from annual giving, only 37 of the schools charging boarding tuition are included but in the upper two quintiles, more than 90 schools charging boarding tuition are included. Therefore, as with financial aid proportions, separate stratifications for schools that charge day tuition and schools that charge boarding tuition were created. Table 4.17 shows the stratification for schools charging day tuition by the ratio of Total Annual Giving to Total Income. There is a slight decrease in the cut-offs from above the cut-offs presented above.

Table 4.17: *Ratio of Total Annual Giving to Total Income at Schools that Charge Day Tuition*

Minimum		0.0023
Maximum		0.7961
Percentiles	20	0.0451
	40	0.0592
	60	0.0755
	80	0.0984

Schools that charge day tuition were stratified according quintiles formed by the above cut-offs. Before looking at the averages year-by-year, let's first look at the overall average day tuition from 2003 to 2013, stratified by the quintiles shown in Table 4.18. As one might expect, the average tuition price increases monotonically through the quintiles.

Table 4.18: *Average Day Tuition, 2003–2013, by the Ratio of Total Annual Giving to Total Income*

Quintile	N	Mean
1	141	$17,577
2	141	19,961
3	141	20,643
4	141	22,733
5	141	24,036

With the exception of the second and third quintiles, in which the mean day tuition differs by less than $700, the means between other quintiles are separated by at least $1,300. Moreover, the average tuition in the fifth quintile is over $6,000 more expensive than average tuition in the first quintile. Thus, the larger percentage a school's budget depends on annual giving, the more expensive the school. An analysis of variance showed that the difference between the average tuition in these quintiles was significant; Sidak post-hoc test analyses revealed that the average day tuition in the first quintile is significantly different from all other quintiles; average tuition in the second quintile is significantly different from the first, fourth and fifth quintiles; likewise, average day tuition in the third, fourth and fifth quintiles is statistically different from average

tuition in the other quintiles, except adjacent quintiles. The statistical test results are included in Appendix E. Year-by-year averages are presented in Table 4.19.

Table 4.19**:** *Day tuition, 2003–2013, by Ratio of Total Annual Giving to Total Income*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2003	126	$15,423	128	$17,368	132	$17,675	134	$19,306	130	$20,974
2004	129	16,167	128	18,290	136	18,675	132	20,555	132	21,875
2005	141	16,235	138	18,329	139	19,094	136	20,965	138	22,229
2006	138	16,656	137	18,790	138	19,582	135	21,216	139	22,794
2007	139	17,117	140	19,280	136	20,086	137	22,013	140	23,336
2008	140	17,609	140	19,837	138	20,715	139	22,747	140	24,110
2009	139	18,007	140	20,424	141	21,035	140	23,280	139	24,558
2010	141	18,770	140	21,349	139	22,102	140	24,461	138	25,688
2011	136	19,122	139	21,842	137	22,648	138	24,965	136	26,354
2012	135	19,303	139	21,872	133	22,931	133	25,133	126	26,606
2013	130	19,589	132	22,786	137	23,405	134	25,521	128	27,167

There is a jump in tuition price from the first to the second quintiles. The significant differences in means discussed in the average tuition from 2003 to 2013 above also apply to the quintiles on a year-by-year basis and are also included in Appendix E. Schools in the first quintile receive less than 4.51% of their yearly income from their annual giving campaigns, while schools in the second quintile earn anywhere from 4.51% to 5.92% of their income from their annual giving campaigns. Schools in the upper quintile—those that generate nearly 10% or more of their annual income from annual giving—boast the highest average day tuition prices.

The average dollar growth amount for tuition in each quintile is $417, $542, $573, $621 and $619, respectively. Tuition in the second and third quintiles and also tuition in the fourth and fifth quintiles moves similarly in pairwise fashion.

There are commonalities that extend across nearly all quintiles for some years. In 2011 and 2012, tuition grew by the smallest, below-average amounts in each quintile. However, from 2010 to 2011, tuition in each quintile grew at substantially above-average amounts. One naturally wonders if the below average growth from 2011 to 2012 was a correction for the above average growth from 2010 to 2011. This is a point that qualitative researchers might want to interrogate further.

Now attention turns to schools charging boarding tuition are stratified according to the ratio of Total Annual Giving to Total Income. Table 4.20 shows the quintile cut-offs for this stratification.

Table 4.20: *Ratio of Total Annual Giving to Total Income at Schools that Charge Boarding Tuition*

Minimum		0.0023
Maximum		0.3872
Percentiles	20	0.0591
	40	0.0856
	60	0.0999
	80	0.1295

Just by looking at the cut-offs one can see that schools charging boarding tuition realize more of their annual income from annual giving than day schools: 80% of schools charging boarding tuition receive more than 5.91% of their income from annual giving whereas 40% of schools charging day tuition receive *less* than 5.91% of their income from annual giving.

However, the relationship between average boarding tuition and the quintiles is less pronounced than it was for average day tuition. Table 4.21 presents average boarding tuition stratified by the above quintiles: unlike with day tuition, there is no monotonicity as one moves from quintile to quintile. Additionally, an analysis of variance showed that the differences between the means in each quintile is not statistically significant.

Table 4.21: *Average Boarding Tuition, 2003–2013, by the Ratio of Total Annual Giving to Total Income*

Quintile	N	Mean
First	26	$41,957
Second	25	42,136
Third	26	40,679
Fourth	26	43,019
Fifth	26	41,649

The average boarding tuition in the first and fifth quintiles is roughly the same and that the fourth quintile, in which between 10% and 12.95% of students receive financial aid has the most expensive average boarding tuition.

Just as an analysis of variance showed no statistically significant difference between the means of the average boarding tuition stratified by quintiles, so too is there no statistically significant difference in the means shown in Table 4.22 below.

Table 4.22: *Boarding Tuition at Schools that Charge Boarding Tuition, 2003–2013, by Ratio of Total Annual Giving to Total Income*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2003	26	$36,876	23	$36,947	25	$35,614	25	$37,218	21	$37,930
2004	26	38,173	25	38,595	23	36,772	26	38,831	24	38,015
2005	26	38,969	25	39,556	25	37,882	26	39,964	26	38,995
2006	25	39,622	24	39,817	25	38,293	26	40,844	25	39,250
2007	26	40,736	22	40,829	26	39,568	25	41,789	26	40,480
2008	26	41,897	22	42,371	26	40,499	25	42,987	26	41,470
2009	26	42,152	25	42,610	26	41,212	26	43,876	25	42,022
2010	26	44,676	25	44,149	26	43,023	25	46,164	26	43,660
2011	26	45,796	25	45,164	26	44,265	25	47,009	25	45,411
2012	25	45,612	25	46,100	24	44,145	23	47,527	24	45,951
2013	24	47,759	23	47,253	22	44,873	23	48,263	22	45,604

There are a few things worth noting in Table 4.22. First, tuition in quintiles one, two and four grew annually by an average amount of $1,000 or more; tuition in the fifth quintile grew annually by an average amount of $767—the lowest average amount of any quintile—which resulted in tuition in the fifth quintile growing by only 20% over the eleven years whereas tuition

in quintiles one and four grew by 30%. Unlike day tuition, there are three instances in which the average boarding tuition in a quintile actually dropped—from 2011 to 2012 in both quintiles one and three and also from 2012 to 2013 in the fifth quintile.

The difference in the behavior of boarding tuition price versus day tuition price when stratified by the ratio of Total Annual Giving to Total Income is striking: with day tuition, greater budgetary reliance on annual giving corresponds to higher tuition prices. Not so, though, with boarding tuition. There does indeed appear to be some price moderation at work in the fifth boarding tuition quintile—after all, these schools garner 13% or more of their annual income from annual giving. Future researchers may want to try to replicate or refute these findings with larger sample sizes; additionally, qualitative research focused on schools in the fifth quintile could help ferret out whether or not there is any active attempt at tuition price moderation or if the data observed is just an anomaly.

Boarding and Day Tuition Stratified by the Average Ratio of Total Endowment to Total Income

The ratio of Total Endowment to Total Income was calculated for each school for the years 2003 to 2013. As with earlier sections, originally all 732 schools in the study were stratified according to the ratio of Total Endowment to Total Income; quintile cut-offs are shown in Table 4.23. Sixty percent of schools have a total endowment to total income ratio of less than 0.8912.

Table 4.23: *Ratio of Total Endowment to Total Income, 2003–2013*

Minimum		0.0041
Maximum		87.4362
Percentiles	20	0.2368
	40	0.5168
	60	0.8912
	80	1.7059

One expects to see the same unevenness play out with this stratification between schools that charge day tuition and schools that charge boarding tuition, as was witnessed above when stratifying all 732 schools by proportion of students on financial aid and then subsequently by the ratio of total annual giving to total income. This happens indeed.

Table 4.24: *Average Day and Average Boarding tuition, 2003–2013, by the Ratio of Total Endowment to Total Income*

	Day Tuition		*Boarding Tuition*	
Quintile	N	Mean	N	Mean
First	144	$18,809	7	$43,542
Second	141	19,457	23	40,862
Third	143	20,165	12	41,761
Fourth	154	22,929	28	43,175
Fifth	123	23,834	59	41,503

In Table 4.24 above, it's clear that endowments are much larger in relation to a school's total income for schools that charge boarding tuition than for schools that charge day tuition. For instance, in the fifth quintile, made up of schools whose endowment is more than 1.7 times their total income, contains the fewest number of schools charging day tuition and yet the largest number of schools charging boarding tuition.

In order to account for this, stratifications were again performed separately for schools that charge day tuition and schools that charge boarding tuition. The cut-offs for schools charging day tuition are shown in Table 4.25.

Table 4.25: *Ratio of Total Endowment to Total Income at Schools that Charge Day Tuition*

Minimum		0.0041
Maximum		87.4362
Percentiles	20	0.2308
	40	0.5080
	60	0.8858
	80	1.6504

These cut-offs were used to establish quintiles which were then used to stratify the overall average day tuition from 2003 to 2013 at the 705 schools that charge day tuition. This is shown in Table 4.26 below.

Table 4.26: Average day tuition, 2003-2013, by ratio of Total Endowment to Total Income

Quintile	N	Mean
1	141	$18,840
2	141	19,367
3	141	20,207
4	141	23,228
5	141	23,309

Average day tuition increases monotonically throughout the quintiles and is highest in the quintile that corresponds to the schools with the highest ratio of total endowment to total income. An analysis of variance shows that the differences between mean tuition in these quintiles is significant. A Sidak post-hoc test reveals that quintiles one, two and three are significantly different from quintiles four and five. Results from the statistical tests are included in Appendix F. Additionally, these statistically significant differences hold when the average tuition is looked at annually from 2003 to 2013, as shown in Table 4.27.

Table 4.27**:** *Day tuition, 2003–2013, by Ratio of Total Endowment to Total Income*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2003	117	$16,077	131	$16,849	134	$17,616	133	$20,005	135	$20,027
2004	120	17,306	132	17,783	137	18,252	130	21,254	138	20,867
2005	139	17,170	139	18,018	140	18,711	137	21,484	137	21,441
2006	139	17,697	133	18,230	140	19,115	136	21,933	139	22,045
2007	138	18,242	141	18,834	141	19,611	135	22,629	137	22,627
2008	141	18,848	140	19,256	137	20,353	141	23,227	138	23,345
2009	141	19,276	140	19,816	139	20,794	140	23,755	139	23,689
2010	140	20,190	139	20,730	139	21,658	140	24,779	140	24,926
2011	135	20,943	137	20,922	140	22,046	137	25,562	137	25,451
2012	135	21,119	136	20,949	135	22,361	133	25,753	127	25,567
2013	127	21,635	133	21,745	136	22,774	135	26,194	130	26,037

One notices that the tuition in the fourth and fifth quintiles is significantly higher than the tuition in the first three quintiles. Perhaps unsurprisingly, tuition in the first quintile grew 35% over the 11 years while tuition in each of the subsequent intervals grew around 30%. So schools with the lowest level of endowment in relation to their total income saw their tuition growth outpace better endowed schools. Finally—and somewhat curiously—tuition in the fifth quintile isn't always higher than tuition in the fourth quintile on a year-by-year basis. In fact, tuition in the fifth quintile was only higher than tuition in the fourth quintile in 2003, 2006, 2008 and 2010. This suggests that once a school's total endowment exceeds 85% of its income (as it does in the fourth quintile), tuition prices at these schools tend to behave similarly, even for substantially better endowed schools whose endowment exceeds 165% of income (as happens in the fifth quintile).

Schools that charge boarding tuition are much better endowed in relation to their total income. Table 4.28 shows the cut-offs for the 129 schools that charge boarding tuition in the study. The difference between these two different groups of schools is striking: above, 60% of schools that charge day tuition had endowments equal to less than 89% of their total income and yet below in Table 4.28, 60% of schools that charge boarding tuition have endowments equal to more than 124% of their total income.

Table 4.28: *Ratio of Total Endowment to Total Income at Schools that Charge Boarding Tuition*

Minimum		0.0335
Maximum		87.4362
Percentiles	20	0.4858
	40	1.2454
	60	2.1684
	80	3.8672

The average boarding tuition across all years from 2003 to 2013 is shown in Table 4.29. An analysis of variance showed no significant differences between the mean tuition in each quintile.

Table 4.29: *Average Boarding Tuition by Ratio of Total Endowment to Total Income*

Quintile	N	Mean
First	26	$42,024
Second	25	41,815
Third	26	42,330
Fourth	27	41,836
Fifth	25	41,407

The most expensive quintile is the third quintile and the least expensive quintile is the fifth quintile. One hesitates to read too much into this, though, since the most expensive and least expensive mean tuition are separated by less than $1,000.

Table 4.30 shows the year-by-year average boarding tuitions for the above quintiles. As has been consistently true for schools that charge boarding tuition, the differences in mean tuition between quintiles is not statistically significant. Still, one notices that tuition in the third quintile—schools whose endowment is between 124% and 216% of their total income—contains some of the highest tuitions in the table. The wealthiest schools—those schools in the fifth quintile whose endowments is more than 386% of their total income—consistently sport lower average tuition than schools in the third and even first quintiles.

Table 4.30: *Boarding Tuition, 2003–2013, by Ratio of Total Endowment to Total Income at Schools that Charge Boarding Tuition*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2003	24	$37,060	24	$38,041	24	$37,129	26	$36,381	22	$35,749
2004	24	38,298	25	38,450	24	38,801	27	37,775	24	37,232
2005	26	39,251	25	39,109	26	39,826	27	38,818	24	38,344
2006	22	39,126	25	39,668	26	40,134	27	39,551	25	39,313
2007	26	41,089	25	40,504	24	40,728	25	40,678	25	40,321
2008	26	42,167	25	41,489	24	42,118	26	41,983	24	41,307
2009	26	42,253	25	42,113	26	42,978	27	42,487	24	42,003
2010	26	44,747	25	43,810	25	44,887	27	44,432	25	43,707
2011	26	45,641	24	45,868	25	45,490	27	45,608	25	45,001
2012	25	45,197	23	46,552	25	46,780	24	45,489	24	45,265
2013	23	46,999	23	46,657	22	47,041	25	47,246	21	45,878

Year to year tuition increases averaged around $1,000 across all quintiles, from a low of $862 in the second quintile to a high of $1,087 in the fourth quintile. Tuition grew fairly constantly across all quintiles over the years 2003–2013 at a rate of about 27%, though the second quintile grew the slowest at 23% and the fourth quintile grew fastest at a rate of 30%.

Research Question 1: Tuition Growth Rates

This part of the research question deals with tuition growth rates. Overall, from 2003 to 2013, the average boarding tuition at the selected schools grew 26.8%, from $36,883 to $46,786. The average day tuition grew 30% during that time, from $18,174 to $23,688. The faster growth in day tuition had only a narrow effect on the gap between day and boarding tuition slightly: in 2003, the average boarding tuition was 2.03 times the average day tuition; by 2013, the average boarding tuition was 1.98 times the average day tuition. Boarding tuition still remains roughly double day tuition.

But growth rates of average tuition tell a very limited part of the story. In order to better understand growth rates of tuition over the period from 2003 to 2013, the year-to-year growth

rates for boarding and day tuition were calculated. These growth rates were then averaged by year and then stratified according the exact same procedures used for tuition prices in the first part of this research question. Since growth rates must be computed by taking the ratio of sequential years' worth of tuition, no growth rates were calculated for 2003. The overall growth rates for boarding and day tuition, for the 729 schools in the study, are shown in Table 4.31.

Table 4.31**:** *Tuition Growth Rates, by Tuition Type, 2004-2013*

	Day Tuition		*Boarding Tuition*	
Year	N	Mean	N	Mean
2004	627	0.042	120	0.032
2005	656	0.031	128	0.027
2006	682	0.024	127	0.016
2007	677	0.028	123	0.027
2008	689	0.031	123	0.026
2009	696	0.020	124	0.014
2010	699	0.046	127	0.050
2011	687	0.022	126	0.025
2012	660	0.007	121	0.006
2013	641	0.021	111	0.034

For both tuition types, growth rates ranged from 0.7% to around 5% at the highest. With the exception of the three years 2011, 2011, and 2013, the average day growth rate exceeded the average boarding growth rate. This reflects the higher growth in day tuition over the period of time being studied.

Boarding and Day Tuition Growth Rates when Stratified by School Type

The exact same stratification procedures used above were used for stratifications in this section. Thus, day tuition growth rates are stratified only for boarding-day, day-boarding and day schools in Table 4.32. With the exception of the years 2006, 2010 and 2011, the growth rates in each category are separated by less than 0.01 when analyzed on a yearly basis.

Table 4.32: *Day Tuition Growth Rates by School Type, 2004–2013*

	Boarding-Day		*Day-Boarding*		*Day*	
Year	N	Mean	N	Mean	N	Mean
2004	50	0.037	48	0.034	522	0.044
2005	53	0.030	49	0.037	546	0.031
2006	51	0.019	51	0.011	574	0.026
2007	50	0.033	49	0.031	575	0.027
2008	53	0.033	48	0.027	582	0.031
2009	54	0.028	50	0.020	586	0.019
2010	56	0.061	49	0.046	587	0.044
2011	54	0.009	48	0.022	577	0.023
2012	51	-0.001	47	0.008	557	0.008
2013	48	0.019	45	0.020	542	0.021

Given that day tuition growth rates remain rather similar across the categories, especially on a year-by-year basis, it's likely that day tuition growth rates have more to do with external factors the school type.

Table 4.33 compares boarding tuition growth rates across school types. The growth rates across the boarding, boarding-day and day-boarding school types are fairly similar from 2005 to 2008 and in 2011. In 2009, which coincides with a recession, boarding tuition at day-boarding grew a lot slower than tuition at other types of schools. Again, this suggests that schools with majority day students may be more susceptible to external economic conditions than schools that are enroll a majority of boarding students. Still, even then the growth rates for boarding and boarding-day schools were somewhat muted in 2009; the take-away here may very well be that drastic economic events, such as the 2009 recess, has an effect on all types of schools.

Table 4.33 appears on the following page.

Table 4.33: *Boarding Tuition Growth Rates by School Type, 2004–2013*

	Boarding		Boarding-Day		Day-Boarding	
Year	N	Mean	N	Mean	N	Mean
2004	11	0.054	63	0.033	42	0.024
2005	11	0.030	69	0.028	44	0.027
2006	10	0.010	68	0.017	46	0.016
2007	10	0.024	66	0.026	45	0.029
2008	9	0.027	68	0.025	45	0.026
2009	9	0.016	69	0.018	46	0.007
2010	11	0.044	71	0.040	45	0.067
2011	11	0.024	71	0.025	44	0.025
2012	10	0.006	68	0.012	42	-0.002
2013	8	0.019	63	0.022	38	0.057

Boarding and Day Tuition Growth Rates when Stratified by Class Code

Table 4.34 shows day tuition growth rates, stratified by Class Code. Schools that are both elementary and secondary appear to more closely follow the rates of secondary schools than those of elementary Schools. Still, as has been seen earlier with day tuition growth rates, there is very little separation in growth rates: for each year from 2004 to 2013, the range of growth rates by Class Code differs by less than 0.01.

Table 4.34: *Day Tuition Growth Rates by Class Code, 2004–2013*

	Elementary		*Secondary*		*Both Elementary and Secondary*	
Year	N	Mean	N	Mean	N	Mean
2004	199	0.042	84	0.042	339	0.043
2005	210	0.034	89	0.032	351	0.029
2006	227	0.027	89	0.019	362	0.023
2007	226	0.029	88	0.030	362	0.027
2008	228	0.033	89	0.035	368	0.028
2009	231	0.021	91	0.024	370	0.018
2010	231	0.046	92	0.053	371	0.044
2011	228	0.025	90	0.015	363	0.022
2012	220	0.009	89	0.005	348	0.006
2013	211	0.021	88	0.018	338	0.022

Boarding tuition is not prevalent at the elementary level and so boarding tuition growth rates were only calculated for secondary and also schools that are both elementary and secondary. These rates are reported in Table 4.35.

Table 4.35: *Boarding tuition growth rates by Class Code, 2004–2013*

	Secondary		*Both Elementary and Secondary*	
Year	N	Mean	N	Mean
2004	75	0.037	34	0.023
2005	82	0.028	34	0.027
2006	81	0.017	35	0.017
2007	79	0.026	34	0.031
2008	79	0.027	35	0.023
2009	80	0.019	36	0.002
2010	84	0.041	35	0.071
2011	84	0.026	34	0.022
2012	80	0.011	33	-0.005
2013	73	0.025	30	0.059

The growth rates parallel one another in 2005 and 2006 and are fairly close together in 2007, 2008, and 2011. In other years, there is somewhat of a divergence, but it is difficult to tease out a larger pattern without exploring variables—both institutional and external economic—beyond the scope of this study.

Boarding and Day Tuition Growth Rates Stratified by Percent of Students on Financial Aid

Table 4.36 shows the growth rates of day tuition stratified by proportion of students on financial aid. The growth rates all seem to move consistently across the quintiles, varying largely by year as opposed to by quintile.

Table 4.36: *Day Tuition Growth Rates, by Proportion of Students on Financial Aid, 2004–2013*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2004	123	0.042	126	0.046	128	0.046	125	0.037	120	0.040
2005	128	0.031	131	0.029	129	0.032	134	0.033	128	0.030
2006	139	0.026	139	0.025	132	0.026	136	0.021	132	0.021
2007	140	0.028	137	0.029	133	0.027	134	0.029	132	0.026
2008	140	0.035	136	0.030	137	0.029	136	0.031	136	0.027
2009	139	0.020	139	0.020	139	0.019	139	0.021	136	0.019
2010	139	0.047	139	0.044	141	0.042	139	0.047	136	0.048
2011	136	0.026	135	0.020	138	0.024	137	0.017	135	0.021
2012	131	0.006	132	0.007	130	0.011	135	0.007	129	0.004
2013	129	0.021	130	0.025	124	0.024	131	0.019	123	0.015

Across all years, the average growth rate is 2.71%. Across the individual quintiles, the average growth rates range from 2.53% in the fifth quintile to 2.79% in the first quintile. An analysis of variance showed that there are no statistically significant differences between the growth rates in the individual quintiles.

The average growth rate for each quintile ranges from 2.6% in the fifth quintile to 2.9% in the first quintile. In 2012, tuition grew by 1.1% or less across all quintiles, though the fifth quintile (in which at least 27.92% of students receive financial aid) has much lower growth rates than the other quintiles. Taken together, day tuition growth rates don't seem to be influenced too much by the proportion of students on financial aid at an institution, although schools that have a higher percentage of students on financial aid do show somewhat smaller tuition growth rates. While there is certainly no proof in the data presented here, a very real possibility is that day tuition is more influenced by larger economic factors than boarding tuition.

Boarding tuition growth rates stratified by proportion of students on financial aid are presented in Table 4.37. Unlike day tuition growth rates in Table 4.36 above, the growth rates for boarding tuition vary a bit more from quintile to quintile. Only in 2007 and 2008 do growth rates seem remarkably constant across the intervals.

Table 4.37: *Boarding Tuition Growth Rates, at Schools that Charge Boarding Tuition by Proportion of Students on Financial Aid, 2004–2013*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2004	23	0.041	25	0.023	24	0.023	23	0.039	21	0.035
2005	25	0.016	25	0.029	26	0.031	25	0.034	23	0.028
2006	26	0.014	25	0.017	23	0.014	26	0.016	24	0.022
2007	26	0.029	25	0.023	21	0.025	26	0.024	23	0.035
2008	26	0.028	25	0.026	23	0.023	24	0.026	24	0.025
2009	26	0.015	26	0.003	23	0.022	24	0.014	25	0.015
2010	26	0.042	26	0.080	25	0.032	25	0.047	25	0.048
2011	26	0.020	25	0.030	25	0.027	25	0.022	25	0.027
2012	24	0.010	24	-0.008	24	0.018	24	0.004	24	0.009
2013	22	0.023	22	0.069	20	0.022	22	0.033	23	0.022

Yet, taken across all years, the overall average growth rate for each quintile is fairly standard, ranging from 2.51% to 2.86%. As with day tuition growth rates, the proportion of students on financial aid does not appear play a large role in influencing tuition growth rates.

Boarding and Day Tuition Growth Rates Stratified by Ratio of Total Annual Giving to Total Income

The rationale behind this stratification relies on the effect that calculating the ratio of total annual giving to total income has on measuring effects of the amount of money raised in annual giving in any one year. For instance, one might consider two hypothetical schools which each raise $500,000 in annual giving. Further suppose that one school's total annual income is $2 million and the other school's total income is $20 million. Clearly, the $500,000 constitutes a much larger share of the first hypothetical school's income. Thus it is essential that the ratio of

total annual giving to total income is calculated. If such ratios weren't, the two hypothetical schools above would appear identical when it came to annual giving since they each raised $500,500.

Table 4.38 shows day tuition growth rates stratified in this way. However, one notices immediately that the growth rates move in tandem with each other across quintiles. Thus, day tuition growth seems very much to rely on outside economic factors than a school's individual success in raising annual giving dollars.

Table 4.38: *Day Tuition Growth Rates at Schools that Charge Day Tuition by the Ratio of Total Annual Giving to Total Income, 2004–2013*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2004	119	0.041	120	0.040	129	0.047	127	0.040	127	0.043
2005	129	0.031	127	0.028	135	0.028	129	0.036	130	0.034
2006	138	0.026	135	0.023	137	0.028	131	0.022	137	0.021
2007	136	0.029	137	0.027	133	0.025	132	0.029	138	0.028
2008	138	0.028	139	0.032	133	0.031	136	0.033	139	0.028
2009	138	0.018	139	0.022	138	0.017	138	0.020	139	0.022
2010	139	0.045	139	0.045	139	0.045	140	0.049	137	0.043
2011	136	0.019	138	0.023	136	0.023	138	0.020	133	0.023
2012	132	0.008	137	0.007	132	0.008	132	0.002	124	0.011
2013	127	0.022	130	0.021	131	0.022	128	0.018	121	0.022

Table 4.39 shows boarding tuition growth rates stratified according to the quintiles established above in Table 4.20 for the ratio of total annual giving to total income at schools that charge boarding tuition. Unlike the trends that have been prevalent with various stratifications of day tuition growth rates, the growth rates in these quintiles vary in a more pronounced way from quintile to quintile.

Table 4.39: *Boarding Tuition Growth Rates at Schools that Charge Boarding Tuition, by the Ratio of Total Annual Giving to Total Income, 2004–2013*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2004	26	0.040	23	0.038	22	0.033	25	0.041	20	0.003
2005	26	0.027	25	0.026	23	0.029	26	0.029	24	0.028
2006	25	0.025	24	0.010	24	0.011	26	0.022	25	0.012
2007	25	0.033	21	0.026	25	0.030	25	0.024	25	0.022
2008	26	0.028	20	0.025	26	0.023	24	0.028	26	0.024
2009	26	0.001	22	0.016	26	0.017	25	0.019	25	0.015
2010	26	0.085	25	0.037	26	0.044	25	0.046	25	0.036
2011	26	0.025	25	0.023	26	0.029	24	0.027	25	0.021
2012	25	-0.007	25	0.023	24	0.005	22	0.001	24	0.011
2013	24	0.067	23	0.024	20	0.017	21	0.032	21	0.024

The growth rates in the first quintile are highest, averaging 3.23% from 2003 to 2013, while the rates in the fifth quintile are the lowest with an overall average growth rate of only 1.89%. In 2010, in the wake of the financial crisis of 2007–09, tuition grew almost twice as fast in the first quintile as it did for schools in every other quintile. Yet in 2009 and 2012, tuition in the first quintile grew more slowly than in other quintiles.

Overall, the growth rates for schools in the fifth quintile are lowest while each of the other quintiles on average have similar growth rates. Thus, as with tuition price, boarding schools with successful annual giving campaigns can not only afford to charge less tuition, they can also afford to raise their tuition at a slower rate than can schools that receive less of their income from annual giving. The unusual variations seen in 2009 and 2012 with respect to the growth rate in the first quintile may have more to do with responses to external economic conditions than internal policy issues. Future researchers may want to investigate these anomalies from a qualitative perspective.

Boarding and Day Tuition Growth Rates Stratified by the Average Ratio of Total Endowment to Total Income

For an even better measure of wealth, the ratio of a school's total endowment to its total income was calculated. Analyzing a school's endowment in relation to the size of its budget allows one consider the actual effect of the endowment on a school's income. For instance, a $5 million endowment could generate a substantial percentage of the income for a school with a budget of $5 million, but a much smaller percentage of income for a school with a budget of $100 million. Table 4.40 displays day tuition growth rates for schools stratified into quintiles using this method. Day tuition seems to move in a similar fashion, year-to-year, across all quintiles, suggesting again that day school tuition practices are tied more to independent economic factors than they are to individual school wealth.

Table 4.40: *Day Tuition Growth Rates at Schools that Charge Day Tuition by the Ratio of Total Endowment to Total Income*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2004	107	0.044	125	0.045	131	0.039	125	0.042	134	0.042
2005	119	0.034	131	0.030	136	0.030	129	0.031	135	0.032
2006	137	0.029	132	0.018	139	0.024	135	0.025	135	0.023
2007	136	0.031	133	0.029	140	0.025	132	0.026	135	0.028
2008	138	0.036	140	0.028	137	0.036	135	0.028	135	0.026
2009	141	0.024	139	0.020	136	0.019	140	0.019	136	0.017
2010	140	0.046	138	0.047	138	0.042	140	0.043	138	0.049
2011	135	0.025	135	0.017	138	0.020	137	0.023	136	0.023
2012	132	0.008	134	0.008	134	0.005	132	0.008	125	0.006
2013	125	0.024	129	0.023	131	0.019	130	0.019	122	0.019

The overall average growth rate in each quintile hovers between a low of 2.59% in the third quintile to 2.99% in the first quintile. The next highest overall average growth rate is only 2.68% in the fifth quintile. On a yearly basis, growth rates move in similar fashion, usually differing by less than 1%. Even here, day tuition grows more or less equally across all types of schools.

Boarding tuition growth rates stratified by the ratio of total endowment to total income are presented in Table 4.41. In the first quintile below, tuition remained more or less constant in 2009 and also 2012, as shown by the slightly negative growth rate (again, recall that all rates shown are calculated based on tuition prices in constant dollars).

Table 4.41: *Boarding Tuition Growth Rates at Schools that Charge Boarding Tuition by the Ratio of Total Endowment to Total Income*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2004	23	0.034	24	0.018	22	0.036	26	0.034	21	0.039
2005	24	0.030	25	0.018	24	0.028	27	0.028	24	0.036
2006	22	0.012	25	0.014	26	0.008	27	0.019	24	0.029
2007	22	0.035	25	0.021	24	0.021	25	0.028	25	0.031
2008	26	0.027	25	0.023	23	0.027	24	0.026	24	0.025
2009	26	-0.003	25	0.014	24	0.024	26	0.018	23	0.016
2010	26	0.087	25	0.040	25	0.040	27	0.046	24	0.037
2011	26	0.019	24	0.028	24	0.022	27	0.027	25	0.030
2012	25	-0.013	23	0.013	24	0.023	24	0.003	24	0.008
2013	23	0.063	22	0.020	21	0.022	23	0.036	20	0.026

The upper three quintiles—those schools whose total endowment is valued at 100% or more of their total annual income—sometimes have growth rates that moved more or less in unison from in 2004 and 2008 and yet these growth rates vary more widely in other years. It is hard to single out any one particular pattern. When one looks at the average overall growth rates per quintile, one sees that more quintiles have an average growth rate of between 2.50% and 2.83%; the second quintile is the one exception in that it sports an overall average growth rate of 1.97%.

The key takeaways from the findings in the first research question are that boarding tuition and day tuition behave in substantially different ways: while boarding tuition remains doubly more expensive than day tuition, day tuition nevertheless grew faster from 2003 to 2013. Additionally, schools that have high ratios of total annual giving to total income charge more for

day tuition yet less for boarding tuition than do schools with lower ratios of total annual giving to total income. This trend holds for the ratio of total endowment to total income—the best-endowed schools charged lower boarding tuition yet higher day tuition. However, the proportion of students on financial aid, the ratio of total endowment to total income and the ratio of total annual giving to total income all seem to have minimal impact on tuition growth rates. Tuition growth rates therefore grow according to other factors, most likely Baumol's cost disease other external economic factors.

Research Question 2

> What is the average proportion of students receiving financial aid overall and what is the average proportion of students receiving financial aid when schools are stratified by: (a) School Type; (b) Class Code; (c) quintiles based on the ratio of total annual giving to total income; (d) quintiles based on the ratio of total endowment to total income; and, (e) quintiles based on tuition price?

In order to calculate the proportion of students on financial aid, the quotient of a school's financial aid enrollment and its enrollment was calculated for each year. Ratios that were greater than one were left blank since such a value could only have occurred by a data entry error. This happened for fewer than 30 schools in the overall dataset *prior* to the selection of 732 schools that is used in this dissertation. Table 4.42 shows the overall proportion of students on financial aid from 2003 to 2013 enrolled at those schools in the study.

Table 4.42: *Proportion of Students Receiving Financial Aid, 2003–2013*

Year	N	Mean
2003	689	0.1752
2004	641	0.1827
2005	671	0.1851
2006	641	0.1880
2007	653	0.1906
2008	648	0.1971
2009	712	0.2051
2010	695	0.2351
2011	696	0.2482
2012	672	0.2514
2013	655	0.2536

The overall proportion of students on financial aid increased monotonically from 2003 to 2013, starting at 17.52% and ending with 25.36% in 2013; the overall average percentage of students on financial aid over the entire 11 years was was 21.17%. The most dramatic increase in financial aid proportion occurred in the wake of the financial crisis of 2008–9: in 2008, only 1971% of students received financial aid and yet by 2010 there were 23.51% of students receiving financial aid.

Proportion of Students Receiving Financial Aid Stratified by School Type

If there are differences in financial aid practices among different types of schools when it comes to the mixture of boarding and day students, this stratification will reveal those differences immediately. As shown in Table 4.43, the differences in the proportion of students on financial aid when stratified by School Type is striking. By far, boarding and boarding-day schools have a much larger proportion of students on financial aid.

Table 4.43: *Proportion of Students Receiving Financial Aid, by School Type, 2003–2013*

	Boarding		*Boarding-Day*		*Day-Boarding*		*Day*	
Year	N	Mean	N	Mean	N	Mean	N	Mean
2003	11	0.2784	70	0.3158	51	0.2272	557	0.1508
2004	11	0.3033	68	0.3134	46	0.2164	516	0.1599
2005	10	0.2760	70	0.3267	48	0.2347	543	0.1608
2006	9	0.3001	60	0.3266	49	0.2240	523	0.1667
2007	9	0.3088	67	0.3257	48	0.2240	529	0.1685
2008	8	0.3158	64	0.3353	45	0.2400	531	0.1751
2009	11	0.3086	73	0.3416	53	0.2490	575	0.1817
2010	10	0.3153	73	0.3690	50	0.2807	562	0.2123
2011	10	0.3420	71	0.3841	49	0.2924	566	0.2256
2012	9	0.3516	69	0.3802	46	0.2869	548	0.2306
2013	6	0.3399	62	0.4029	48	0.2824	539	0.2329
Average	11	0.3039	75	0.3462	53	0.2538	593	0.1893

There is a strong connection between the presence of a boarding program and the practice of giving financial aid. Of course, schools with boarding programs are much more expensive than day schools and, as has been seen above, generally have larger endowments. A one way analysis of variance showed that the differences in the mean proportion of students on financial aid between school type were in fact significant, $F(3,728)=71.4$, $p<0.001$. Results from the Sidak post-hoc test are shown in Table 4.44; with the exception of boarding schools, boarding-day schools have statistically significant higher percentages of students on financial aid than any other type of school.

Table 4.44. *Sidak Comparisons for Financial Aid Proportion by School Type*

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-0.04229	0.02995
Boarding vs. Day Boarding	0.05012	0.03074
Boarding vs. Day	.11467*	0.02823
Boarding-Day vs. Day-Boarding	.09241*	0.01665
Boarding-Day vs. Day	.15696*	0.01137
Day-Boarding vs. Day	.06455*	0.0133

* The mean difference is significant at the 0.05 level.

Proportion of Students Receiving Financial Aid Stratified by Class Code

Without even viewing the results of this stratification, one is likely to intuitively conclude that what is true for boarding students above will also hold for secondary students, i.e., a strictly elementary school would likely have a lower proportion of students on financial aid than would a secondary school. This is precisely what Table 4.45 reveals: elementary schools average 17.86% of students on financial aid; combined elementary and secondary schools average 20.22% of students on financial aid; and, strictly secondary schools average 30.74% of students on financial aid.

Table 4.45: *Proportion of Students that Receive Financial Aid, by Class Code, 2003–2013*

	Elementary		*Secondary*		*Both Elementary and Secondary*	
Year	N	Mean	N	Mean	N	Mean
2003	218	0.1374	116	0.2806	355	0.1640
2004	197	0.1454	109	0.2851	335	0.1713
2005	207	0.1489	111	0.2876	353	0.1742
2006	204	0.1553	103	0.2816	334	0.1790
2007	202	0.1585	105	0.2915	346	0.1788
2008	204	0.1604	104	0.2952	340	0.1892
2009	226	0.1682	119	0.3064	367	0.1949
2010	220	0.1972	116	0.3297	359	0.2278
2011	227	0.2135	117	0.3389	352	0.2403
2012	215	0.2145	115	0.3384	342	0.2454
2013	209	0.2223	105	0.3483	341	0.2437
Average	235	0.1768	123	0.3074	374	0.2022

Moreover, across all categories the percentage of students on financial aid grows slowly prior to 2008, and then much faster after 2009, possibly again suggesting that schools see the need to respond to large economic conditions when it comes to giving financial aid, though strictly secondary schools have always provided financial aid to greater than 20%—indeed, in excess of 28%—of their students in the years of this study.

Proportion of Students Receiving Financial Aid Stratified by Quintiles Based on the Ratio of Total Annual Giving to Total Income

This part of the research question seeks to determine whether schools with more successful annual giving campaigns provide financial aid to a greater percentage of their students. Table 4.46 shows that schools which garner the lowest percentage of their income from annual giving do indeed provide financial aid to a lower percentage of their students.

Table 4.46: *Proportion of Students Receiving Financial Aid, by the Ratio of Total Annual Giving to Total Income, 2003–2013*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2003	134	0.1439	137	0.1548	141	0.1544	139	0.1904	138	0.2319
2004	128	0.1534	122	0.1680	132	0.1606	131	0.1979	128	0.2332
2005	134	0.1529	130	0.1662	137	0.1639	139	0.2059	131	0.2369
2006	132	0.1587	129	0.1716	130	0.1632	121	0.2023	129	0.2457
2007	130	0.1614	129	0.1679	136	0.1707	128	0.2084	130	0.2458
2008	125	0.1708	127	0.1804	135	0.1747	128	0.2088	133	0.2495
2009	142	0.1790	141	0.1878	144	0.1809	143	0.2195	142	0.2583
2010	139	0.2146	138	0.2152	137	0.2117	140	0.2508	141	0.2820
2011	137	0.2339	139	0.2346	141	0.2241	143	0.2603	136	0.2885
2012	139	0.2334	138	0.2433	132	0.2339	137	0.2637	126	0.2853
2013	134	0.2424	130	0.2460	134	0.2311	128	0.2641	129	0.2859
Average	147	0.1869	145	0.1960	147	0.1892	146	0.2262	147	0.2603

Schools in the first three quintiles have fewer than one-fifth of their students on financial aid; however, in the fourth quintile, an average of 22.62% of students are on financial aid, and in the fifth quintile—the schools that raise the largest percentage of their income from annual giving—an average of 26.03% of students are on financial aid. Intuitively, this makes sense since annual giving campaigns are often advertised as directly benefitting a school's financial aid fund. As one is accustomed to seeing, the percentage of students on financial aid jumped in all quintiles in 2010, perhaps in response to economic conditions. A one way analysis of variance test confirms that there is a statistically significant difference in financial aid proportions between the quintiles, $F(4, 727)=13.946$, $p<0.001$. Results from the Sidak post-hoc test are shown in Table 4.47 below. Schools in quintiles four and five award financial aid to statistically significant greater percentages of students than schools in the first three quintiles.

Table 4.47. *Sidak Comparisons for Proportional Financial Aid Enrollment by Ratio Total Annual Giving to Total Income*

Quintile Comparisons	*Mean Difference*	*Std. Error*
5 vs, 1	.07339*	0.01187
5 vs. 2	.06428*	0.01191
5 vs. 3	.07103*	0.01187
5 vs. 4	.03411*	0.01189
4 vs. 1	.03928*	0.01189
4 vs. 2	0.03017	0.01193
4 vs. 3	.03692*	0.01189
3 vs. 1	0.00236	0.01187
3 vs. 2	-0.00675	0.01191
2 vs. 1	0.00911	0.01191

* The mean difference is significant at the 0.05 level.

The direct connection between the ratio of a school's total annual giving to total income and its ability to award financial aid to a healthy percentage of its students is provocative: schools seeking to increase the percentage of their students on financial aid might be well-served in exploring ways to maximize their annual giving.

Proportion of Students Receiving Financial Aid Stratified by Quintiles Based on the Ratio of Total Endowment to Total Income

This aspect of the research question tests whether wealthier schools host a larger proportion of students on financial aid. As the research has shown, schools with robust annual giving campaigns do in fact have larger proportions of students on financial aid. It makes sense to expect that the same will hold for wealthier schools. The data in Table 4.48 verify this hypothesis. And again, one also notices an across-the-board increase in the financial aid proportion occurs in the wake of the 2007–09 recession.

Table 4.48: *Proportion of Students Receiving Financial Aid, by the Ratio of Total Endowment to Total Income, 2003–2013*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2003	126	0.1460	136	0.1638	141	0.1494	152	0.1844	134	0.2311
2004	115	0.1565	130	0.1731	133	0.1590	137	0.1911	126	0.2322
2005	133	0.1578	136	0.1739	134	0.1573	145	0.1974	123	0.2429
2006	129	0.1615	125	0.1783	133	0.1605	136	0.1964	118	0.2484
2007	125	0.1679	132	0.1802	137	0.1658	131	0.1979	128	0.2427
2008	123	0.1805	130	0.1819	129	0.1693	143	0.2073	123	0.2472
2009	138	0.1785	142	0.1977	145	0.1831	152	0.2124	135	0.2552
2010	137	0.2176	141	0.2297	138	0.2116	149	0.2390	130	0.2800
2011	136	0.2410	140	0.2459	142	0.2240	153	0.2475	125	0.2867
2012	135	0.2381	141	0.2536	134	0.2226	146	0.2576	116	0.2898
2013	128	0.2401	133	0.2623	131	0.2211	143	0.2553	120	0.2920
Average	146	0.1923	147	0.2063	146	0.1854	156	0.2187	137	0.2585

For schools in the first three quintiles, the average percentage of students receiving financial aid is between 19.23% and 18.54%. But schools in the fourth quintile average 21.87% of their students on financial aid, and the wealthiest schools in the fifth quintile—those whose endowment is equal to at least 170% of their total income ─ average a total of 25.85% of their students on financial aid. Additionally, a one way analysis of variance shows that there is a significant difference in the proportion of students on financial aid between these quintiles, $F(4\ 727)=11.135$, $p<0.001$.

Not all quintiles are significantly different from one another, as is evident in visual inspection of the data year-by-year above. The wealthiest schools, in the fifth quintile, have significantly (and substantially) more students on financial aid than schools with a lower ratio of total endowment to total income in any other quintile. Table 4.49 summarizes the Sidak post-hoc results and delineates statistically significant differences between other quintiles.

Table 4.49. *Sidak Comparisons for Proportional Financial Aid Enrollment by Ratio of Total Endowment to Total Income*

Quintile Comparisons	*Mean Difference*	*Std. Error*
5 v.s 1	.06623*	0.01219
5 vs. 2	.05219*	0.01217
5 vs. 3	.07311*	0.01219
5 vs. 4	.03983*	0.012
4 vs. 1	0.0264	0.0118
4 vs. 2	0.01236	0.01178
4 vs. 3	.03328*	0.0118
3 vs. 1	-0.00688	0.012
3 vs. 2	-0.02092	0.01198
2 vs. 1	0.01404	0.01198

* The mean difference is significant at the 0.05 level.

Proportion of Students Receiving Financial Aid Stratified by Quintiles Based on Tuition Price

In order to stratify by tuition price, schools must again be separated based on whether they charge boarding tuition or day tuition. Returning to the selection of 129 schools that charge boarding tuition, it is possible to calculate quintile cut-offs for boarding tuition. The cut-offs for boarding tuition quintiles are shown in Table 4.50.

Table 4.50: *Average boarding tuition, 2003–2013*

Mean		$41,886
Minimum		6,175
Maximum		71,647
Percentiles	20	38,435
	40	42,064
	60	43,580
	80	44,875

In the next table, Table 4.51, the proportion of students receiving financial aid, stratified by boarding tuition price, is shown. As has been discussed above, boarding schools have excellent

track records when it comes to providing financial aid to a large percentage of their students. In four of the five quintiles, the average percentage of students on financial aid is in excess of 30 % and, in the second most-expensive quintile, 33.75%. The fifth and most expensive quintile—schools whose average boarding tuition from 2003 to 2013 was in excess of $44,875—actually displays the lowest percentages of students on financial aid. This echoes what was seen above in both Table 4.13 and Table 4.14: boarding schools that provided financial aid to some of the lowest percentages of students also had some of the highest tuition. That said, it important to note than an analysis of variance showed that the differences among these quintiles is not statistically significant.

Table 4.51**:** *Proportion of students receiving financial aid, stratified by boarding tuition price, 2003–2013*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2003	25	0.2591	23	0.2591	26	0.2991	25	0.3044	23	0.2427
2004	23	0.2541	23	0.2639	24	0.2981	22	0.3084	24	0.2386
2005	24	0.2666	24	0.2894	26	0.2894	24	0.3251	22	0.2504
2006	26	0.2692	21	0.2659	18	0.2892	24	0.3225	20	0.2413
2007	22	0.2848	22	0.2738	26	0.2730	24	0.3215	22	0.2486
2008	18	0.3033	21	0.2857	22	0.2998	23	0.3175	23	0.2526
2009	25	0.3143	24	0.3010	26	0.2955	26	0.3275	26	0.2571
2010	24	0.3541	24	0.3314	25	0.3162	25	0.3594	25	0.2875
2011	23	0.3557	23	0.3500	26	0.3217	24	0.3728	24	0.3259
2012	24	0.3460	22	0.3539	24	0.3485	24	0.3869	23	0.2840
2013	23	0.3527	20	0.3448	23	0.3386	20	0.4107	22	0.3086
Average	26	0.3055	25	0.3054	26	0.3037	26	0.3375	26	0.2687

The 705 schools that charge day tuition in the study were also stratified according to day tuition price as well. The quintile cut-offs are shown in Table 4.52.

Table 4.52: *Average Day Tuition, 2003–2013*

Mean		$20,990
Minimum		2,966
Maximum		43,099
Percentiles	20	15,301
	40	18,216
	60	21,950
	80	26,875

The proportions in Table 4.53 tend to follow a progression one has seen again and again with day schools and financial aid: the lower the price, the lower the proportion of students on financial aid. Still, across the board, there is an increase in the percentage of students on financial aid in the wake of the 2008 financial crisis. Prior to 2007, no quintile averaged more than 20% of students on financial aid; by 2010, though, all quintiles awarded financial aid to more than 20% of their students.

Table 4.53: *Proportion of Students Receiving Financial Aid, by Day Tuition, 2003–2013*

	1st Quintile		2nd Quintile		3rd Quintile		4th Quintile		5th Quintile	
Year	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
2003	122	0.1497	135	0.1579	138	0.1651	135	0.1789	135	0.1939
2004	107	0.1654	126	0.1664	129	0.1656	127	0.1869	127	0.1983
2005	124	0.1642	132	0.1691	129	0.1718	128	0.1901	134	0.2035
2006	124	0.1691	123	0.1727	129	0.1794	120	0.1965	124	0.1985
2007	126	0.1761	123	0.1689	126	0.1773	129	0.1978	126	0.2024
2008	123	0.1825	126	0.1847	127	0.1837	126	0.2056	125	0.2039
2009	134	0.1925	135	0.1948	136	0.1871	139	0.2117	141	0.2060
2010	134	0.2205	132	0.2284	132	0.2263	135	0.2428	136	0.2276
2011	128	0.2333	137	0.2436	132	0.2470	137	0.2523	136	0.2367
2012	126	0.2436	130	0.2566	126	0.2420	132	0.2598	133	0.2323
2013	124	0.2393	126	0.2653	123	0.2457	132	0.2555	130	0.2418
Average	141	0.1955	141	0.2036	141	0.2019	141	0.2180	141	0.2129

The differences in the results between boarding and day tuition in this research question reflect the differences seen in earlier findings between the financial aid practices at schools with a boarding program and those that are day schools.

In summary, the findings for this research question show that schools that have more substantial financial resources, whether from annual giving or from total endowment, are actively providing financial aid for a significantly larger percentage of students than are schools which lack similar financial resources. Additionally, boarding schools provide financial aid to a substantially higher percentage of their students that do day schools.

The most powerful finding is the direct connection between annual giving and financial aid. Schools that earn 10% or more of their income from annual giving award financial aid to substantially and statistically significant more students than do schools that earn less than 10% of their income from annual giving.

Research Question 3

> What is the relationship between: (a) a school's endowment and its tuition price; (b) the ratio of a school's total endowment to its total income and tuition price; (c) a school's endowment and total annual giving; and (d) the ratio of a school's total endowment to total income and total annual giving.

This question revolves around testing correlations for pairs of variables in the study. The effects of the recession in 2009 were evident in the findings for Research Question 2. Because of this, four different subsets of data were used to explore this question. Subset 1 consists of prerecession data from the years 2003, 2004, 2005, and 2006. Subset 2 consists of data from the years 2007, 2008, and 2009. Subset 3 consists of the years 2010, 2011, 2012, and 2013. Finally, Subset 4 consists of data from all 11 years in the study, 2003 through 2013. For each subset, the

variables tested were averaged across the years in the subset. By calculating correlations for separate subsets, one can determine whether correlations exist and if they vary over time.

Relationship Between a School's Endowment and its Tuition Price

Table 4.54 presents the correlations for both boarding tuition and endowment as well as day tuition and endowment for each of the four subsets discussed above.

There is significant correlation between boarding tuition and endowment in several subsets. Significance is reported for Subsets 1, 2, and 4. These correlations are all weak to moderate and are all negative: -0.445, -0.435 and -0.357, respectively. A negative correlation indicates that boarding tuition is inversely proportional to the size of an institution's endowment. During all years except those immediately following the recession (Subset 3), wealthier boarding schools engaged in some sort of price moderation, though only at a weak to moderate degree.

Table 4.54: *Correlations Between Day Tuition, Boarding Tuition and Total Endowment, by Subsets of the years from 2003–2013*

		Average Day Tuition	*Average Boarding Tuition*
Average Endowment (Sub 1)	Pearson Correlation	-0.059	-.445**
	Sig. (2-tailed)	0.114	0.000
	N	711	138
Average Endowment (Sub 2)	Pearson Correlation	-0.060	-.435**
	Sig. (2-tailed)	0.108	0.000
	N	708	131
Average Endowment (Sub 3)	Pearson Correlation	.284**	0.036
	Sig. (2-tailed)	0.000	0.683
	N	714	134
Average Endowment (Sub 4)	Pearson Correlation	-0.029	-.357**
	Sig. (2-tailed)	0.441	0.000
	N	724	144

** Correlation is significant at the 0.01 level (2-tailed).

Boarding tuition prices behave differently in different settings, especially when metrics of institutional wealth are concerned (e.g., earlier in the ratio of annual giving to total income and the ratio of total endowment to total income). With day tuition in this setting, though, the only significant correlation exists during the four years from 2010 to 2013, which correspond to the Subset 3. This correlation is positive at 0.284 indicating that day tuition varied directly in a weak manner with total endowment in the years immediately following the recession. As we have been want to speculate before, day tuition seems less correlated to institutional variables and is possibly more closely linked to external economic factors.

It's important to note that the correlations in Table 4.54 are not strong, for either boarding or day tuition; institutional wealth is not a great predictor of tuition price. Weak to moderate correlations have modest conclusions.

Relationship Between the Ratio of a School's Total Endowment to its Total Income and Tuition Price

As before, calculations were run separately for boarding tuition and then again for day tuition. Table 4.55 presents correlations for the ratio of total endowment to total income and both boarding and day tuition. For boarding tuition, significant correlations are reported for Subsets 1, 2, and 4. These subsets all boast weak to moderate negative correlations between boarding tuition price and the ratio of a school's endowment to its total income exists. Even when a school's endowment is viewed in relation to its total income, boarding tuition remains negatively correlated with this measure of institutional wealth.

Table 4.55: *Correlations Between the Ratio of Total Endowment to Total Income and each Boarding and Day Tuition, by Subsets of the Years 2003–2013*

		Average Boarding Tuition	*Average Day Tuition*
Average Ratio of Total Endowment to Total Income (Sub 1)	Pearson Correlation	.309**	.288**
	Sig. (2-tailed)	0.000	0.000
	N	138	711
Average Ratio of Total Endowment to Total Income (Sub 2)	Pearson Correlation	-.441**	-0.068
	Sig. (2-tailed)	0.000	0.071
	N	131	708
Average Ratio of Total Endowment to Total Income (Sub 3)	Pearson Correlation	-0.010	.228**
	Sig. (2-tailed)	0.910	0.000
	N	134	714
Average Ratio of Total Endowment to Total Income (Sub 4)	Pearson Correlation	-.351**	0.013
	Sig. (2-tailed)	0.000	0.730
	N	144	724

** Correlation is significant at the 0.01 level (2-tailed).

The same correlations were calculated with respect to day tuition price and are also shown also in Table 4.55 above. The only statistically significant correlations occurred in the first and third subsets, that is, prior to and immediately after the recession years. During these two discrete time periods, day tuition was slightly positively correlated to the ratio of total endowment to total income, meaning that day tuition varied directly with the ratio of total endowment to total income. Still, Subset 4, which takes the entire 11 years together, shows no correlation between day tuition and this measure of institution wealth. Thus the relationship between day tuition and the ratio of total endowment to total income is weak at best. And overall there is a weak connection between the size of a school's endowment in relation to its income and tuition price.

The relationship between the Ratio of a School's Total Endowment to Total Income and Total Annual Giving

Table 4.56 shows both correlations for the relationship between the ratio of a school's endowment to total income and a school's total annual giving as well as correlations between the ratio of total annual giving to total income and total endowment. The first set of correlations is discussed here. Except for the notable exception of the recession years (Subset 2), one finds a significant positive correlation between the ratio of endowment to income and total annual giving. Perhaps tellingly, the highest correlation value occurs in the first subset, the years 2003–2006, in which the correlation between the ratio of total endowment to total income and total annual giving was a healthy 0.510. Then, during the recession years from 2007 to 2009, no significant correlation existed. Afterward (in years represented by Subset 3), the significant correlation returned again at 0.410. While none of these correlations is demonstrably strong, these correlations pint to a weak direct connection between annual giving and institutional wealth as measured by the ratio of total endowment to total income.

Table 4.56: *Correlations between Average Total Annual Giving and the ratio of Total Endowment to Total Income and also Average Endowment, by subsets of years from 2003–2013*

		Average Ratio of Total Endowment to Total Income	*Average Endowment*
Average Total Annual Giving (Sub 1)	Pearson Correlation	.510**	.128**
	Sig. (2-tailed)	0.000	0.001
	N	725	726
Average Total Annual Giving (Sub 2)	Pearson Correlation	0.029	0.060
	Sig. (2-tailed)	0.434	0.105
	N	722	722
Average Total Annual Giving (Sub 3)	Pearson Correlation	.410**	.574**
	Sig. (2-tailed)	0.000	0.000
	N	728	728
Average Total Annual Giving (Sub 4)	Pearson Correlation	.219**	.179**
	Sig. (2-tailed)	0.000	0.000
	N	732	732

** Correlation is significant at the 0.01 level (2-tailed).

The relationship Between a School's Endowment and Total Annual Giving

Unlike the previous question in which in which a school's total endowment taken in relation to its total income—a smoothing of sorts—this question seeks to understand whether raw measures of wealth such as endowment size and annual giving vary directly with one another. Indeed, intuitively, one might expect at the outset that this would reveal a very strong positive correlation. This is not the case. The results are also presented in Table 4.56.

The weak correlations between annual giving and the raw total endowment measure of institutional wealth shows that schools of varying sizes of endowments can be successful at running healthy annual giving campaigns. The highest positive correlation is 0.574 and occurred during the post-recession years (Subset 3), indicating that in the wake of larger economic events, wealth plays a role in recovery. Still, schools looking to increase the amount of money raised through annual giving need not feel stymied if they don't already have large endowments since the correlation between institutional wealth and annual giving is weak at best.

Research Question 4

In the above findings, one has seen that day tuition pricing behaves somewhat differently than boarding tuition pricing when related to the variables we've investigated. There are also substantially more instances of day tuition than boarding tuition in the sample set. Thus, when turning toward regression, it makes sense to limit one's focus to day tuition, so the research question is:

> To what extent do the following variables add to the prediction of day tuition price, ***Y***: ratio of endowment to total income , $\boldsymbol{X_1}$; total annual giving per student (i.e., ratio of total annual giving to total enrollment),$\boldsymbol{X_2}$; and, average financial aid award (i.e., ratio of financial aid dollars to total financial aid students), $\boldsymbol{X_3}$?

My predicted regression equation, using the above notations, is:

$$\mathbf{Y} = B_0 + B_1 \boldsymbol{X_1} + B_2 \boldsymbol{X_2} + B_3 \boldsymbol{X_3}$$

Again, to control for variations in economy, regression models were run for each of the four subsets outlined above in Research Question 3. Since the regression equation was identified in advance, the "Enter" method was used in SPSS when running linear regression tests. A separate regression model was constructed for each subgroup. Table 4.57 shows model summaries. It appears that the predicted equation does a *partial* job of prediction day tuition price, especially when one looks at Subset 1 and Subset 4.

Table 4.57: *Model Summaries, subset of the years 2003–2013*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.579[a]	0.335	0.332	4885.02085
2	.349[b]	0.122	0.118	6322.52424
3	.335[c]	0.112	0.108	7104.80322
4	.523[d]	0.273	0.27	5745.75864

[a] Predictors: (Constant), Average Ratio of Total Endowment to Total Income (Sub 1), Average Ratio of Financial Aid Dollars to Enrollment (Sub 1), Average Total Annual Giving Per Student (Sub 1)
[b] Predictors: (Constant), Average Ratio of Total Endowment to Total Income (Sub 2), 2Average Ratio of Financial Aid Dollars to Enrollment (Sub 2), Average Total Annual Giving Per Student (Sub 2)
[c] Predictors: (Constant), Average Ratio of Total Endowment to Total Income (Sub 3), Average Ratio of Financial Aid Dollars to Enrollment (Sub 3), Average Total Annual Giving Per Student (Sub 3)
[d] Predictors: (Constant), Average Ratio of Total Endowment to Total Income (Sub 4), Average Ratio of Financial Aid Dollars to Enrollment (Sub 4), Average Total Annual Giving Per Student (Sub 4)

Model 1, which corresponds to the prerecession years of 2003 to 2006 and Model 4, which corresponds to the entire period from 2003 to 2013, both have relatively large R^2 values compared to Models 2 and 3.

Table 4.58 shows the coefficients for both Model 1, which uses the years 2003–2006, and Model 4, which corresponds to the years 2003–2013.

Table 4.58. *Coefficients for Models 1 and 4, Dependent Variable Average Day Tuition*

Model	*Unstandardized Coefficients*		*Standardized Coefficients*	*t*	*Sig.*	*Correlations*		
	B	*Std. Error*	*Beta*			*Zero-order*	*Partial*	*Part*
(Constant)	14914.09	291.973		51.08	0			
Average Ratio of Financial Aid Dollars to Enrollment (Sub 1)	0.146	0.015	0.323	9.956	0	0.448	0.351	0.305
Average Total Annual Giving Per Student (Sub 1)	1.119	0.114	0.345	9.791	0	0.483	0.346	0.3
Average Ratio of Total Endowment to Total Income (Sub 1)	305.334	123.532	0.084	2.472	0.014	0.287	0.093	0.076
(Constant)	17420.128	319.573		54.511	0			
Average Ratio of Financial Aid Dollars to Enrollment (Sub 4)	0.104	0.012	0.285	8.732	0	0.371	0.309	0.277
Average Total Annual Giving Per Student (Sub 4)	1.127	0.097	0.385	11.582	0	0.437	0.396	0.368
Average Ratio of Total Endowment to Total Income (Sub 4)	-145.713	60.162	-0.078	-2.422	0.016	0.013	-0.09	-0.077

The partial correlations indicate that the variables in the model are not completely independent of one another; as we have seen in earlier findings, there is a relationship between annual giving and the ratio of endowment to income. Thus, this model does not appear to hold much predictive promise beyond underscoring what we have already found in our earlier

analyses. The same concept holds when we look at the correlations in the coefficient table associated with Model 4.

When looking at the individual coefficients, one notices that the inclusion of the ratio of total endowment to total income is not significant. With such a modest R^2 value, one should be prepared to search for variables that can be added to the model. However, that is beyond the scope of this research question, the aim of which is to test the regression model hypothesized at the outset of this study.

Overall, one sees that per-student annual giving and per-student financial aid awards do play some role in predicting day tuition price.

Conclusion

The findings in this chapter illustrate both the power and limitations of institutional wealth. Day schools, by and large, have moderate endowments and are able to provide financial aid to a measured proportion of their students. Boarding schools, on the other hand, tend to have larger endowments and are able to provide financial aid to a higher percentage of their students. But boarding tuition is also twice as expensive as day tuition. Additionally, both types of tuition grew at fairly consistent rates across the board, irrespective of the measures of institutional wealth used in this study. This suggests that lurking variables lie behind decisions to increase tuition; the most probable candidates are Baumol's cost disease coupled with external economic conditions. In order to more fully investigate, additional data from a broader range of sources and metrics is needed.

One promising finding has more to do with short-term measures of institutional wealth than the traditional long-view measure of endowments: schools that were able to provide in excess of 10% of this income via annual giving were able to significantly and substantially grant financial

aid to more of their students than schools that did not raise as much money in annual giving. There is a very real incentive for schools to investigate ways to maximize their annual giving programs.

The next chapter discusses this finding and other findings in more depth.

CHAPTER 5. DISCUSSION

Introduction

Today's independent schools in America are descended from the academies that flourished in the early years of the American republic. These schools, lacking the extensive endowments of their English forbearers, pieced together a system of funding that relied on state support, tuition, and philanthropy. American independent schools have inherited these revenue models and now rely primarily on endowments, annual giving, and tuition dollars for their income each year. Additionally, as tuition prices have risen dramatically over the years, financial aid has increasingly become important for independent schools. Thus, gaining an understanding of how these four variables—endowment, annual giving, tuition and financial aid—work together is crucial for further work in understanding independent school financial models.

The goal of this study was to achieve a better understanding of the relationship between tuition price (both boarding and day) and the percentage of financial aid students and different metrics of institutional wealth such as annual giving, endowment and total income by establishing baseline knowledge about the interplay among these variables from a quantitative perspective. Now that this baseline has been established, future research can focus on delving more into these relationships, perhaps via qualitative studies that analyze the decision processes governing the way in which these key variables interact.

With such a direction in mind, this chapter presents seven conclusions drawn from the study's findings, discusses the study's limitations, and provides suggestions of areas for future research.

Conclusions

Twenty years ago NAIS published *Access and Affordability: Strategic Financial Perspectives for Independent Schools* and since that time much attention has deservedly been placed on access and affordability in the independent school world. Many of the conclusions below relate directly to issues of access and affordability since they directly address the relationships between financial aid, tuition price, and measures of school wealth.

Both boarding and day tuition is higher at schools whose student body is made up of at least 50% boarding students.

The nation's most expensive schools have a significant boarding population. NAIS uses the variable School Type to classify schools in one of four ways: boarding, boarding-day, day-boarding and day. A boarding school serves 95% or more boarding students. Similarly, a day school has 95% or more day students. A boarding-day school has at least 50% (but less than 95%) boarding students and a day-boarding school similarly has more than 50% (but fewer than 95%) day students . When tuition was broken down by School Type, even day tuition at boarding-day and day-boarding schools was higher than at day schools (1.30 and 1.08 times as much, respectively). Boarding tuition is already roughly double day tuition. Thus, the presence of a boarding program had a direct effect on the tuition price of the school at both the boarding and day levels. This flies in the face of the intuition of the layperson who incorrectly assumes that the presence of a boarding program is used to moderate day tuition price. That doesn't happen.

Schools that provide financial aid to the lowest proportion of students charge the lowest tuition price.

Schools were broken up into quintiles based on the proportion of students on financial aid. Schools in the first quintile awarded financial aid to fewer than 12.73% of their students while

schools in the fifth quintile awarded financial aid to more than 28.88% of their students. When tuition prices were broken down according to these quintiles, the tuition price for schools that had the lowest percentage of students receiving financial aid was demonstrably lower than at schools that carried a larger percentage of their student body on financial aid. This finding closely parallels tuition prices at the collegiate level, where bargain schools offer less financial aid than their more expensive counterparts.

While this finding makes sense intuitively, it raises the same questions parents of college-aged students have often wondered about for the parents of school-aged children: are lower-priced schools really cheaper in the long run, especially when one takes into account the presence of potentially more financial aid from more expensive schools. This is an area that would benefit from further research. Qualitative research could delve into the decision practices surrounding financial aid allotment and tuition price-setting at these schools.

The nation's boarding schools have a significantly higher percentage of students on financial aid than do day schools.

When the proportion of students on financial aid is stratified by School Type, schools that enroll 50% or more boarding students average at least 30% of their students on financial aid whereas schools that are more than 50% day average less than 30% of students on financial aid. And for schools that are 95% or more day students, the difference is even more pronounced: the number of their students on financial aid averages less than 25%. These differences are statistically significant. It would be interesting to follow these findings up with qualitative research that examines the reasons behind these differences: for instance, do boarding schools just give a higher percentage of their student financial aid because they're more expensive, or are they more committed to fostering socio-economic diversity that their day counterparts?

Day tuition grew slightly fasterer than boarding tuition over the years 2003 to 2013.

Even though boarding tuition is substantially more than day tuition, the average boarding tuition only grew from $36,141 in 2003 to $45,647 in 2013, which is an increase of 26%. Day tuition increased by 30% during that same time, from $16,234 to $22,323. However, this had little impact on the overall difference in the two types of tuitions. The average boarding tuition was 2.02 times the average day tuition in 2003 but by 2013 that ratio had decreased a bit to 1.98. What is not clear—and cannot be known from this study—are the reasons behind this trend. For instance, is day tuition trying to catch up to boarding tuition, hence its faster growth rate? Or, is boarding tuition growth slowing down in response to national economic factors such as stagnant wages?

The proportion of students on financial aid increased from 2003 to 2013, especially after 2009.

In 2003, only 17.52% of students were on financial aid. By 2013, that percentage had grown to 25.36% of students on financial aid. The percentage of students on financial aid jumped most dramatically from 20.51% in 2009 to 23.51% in 2010. In fact, the percentage of students on financial aid did not cross the 20% threshold until 2009.

At the surface, the recession from 2007 to 2009 appears to be the likely culprit for the increase in financial aid from 2009 to 2010. This parallels the findings of Rush and Gilmore (2012) who found that schools were quick to respond to market conditions caused by the 2009 recession.

The higher the ratio of total annual giving to total income, the greater the percentage of students on financial aid.

Schools in the upper quintile of the ratio of total annual giving to total income have averaged at least 22% of students on financial aid for the years 2003–2013. Schools in this quintile raised

on average 10% or more of their total income from their annual giving. By contrast, schools in the lower two quintiles raised less than 6% of their total income from annual giving.

Most schools market their annual giving campaigns as ways to contribute to the financial aid resources of a school. This finding make clear that the total amount raised in annual giving is important in direct relation to the school's total income: the greater the percentage of income annual giving accounts for, the higher percentage of students on financial aid. Thus, schools searching to increase the percentage of students on financial aid would do well to concentrate on increasing their annual giving returns.

Boarding and day tuition have an opposite, though somewhat weak, relationship to the ratio of total endowment to total income.

When average tuition prices were stratified according to the ratio of total endowment to total income, day tuition was higher for schools whose endowment was 87% or more than its total income, yet for boarding tuition the same trend didn't hold: schools in the upper most quintile actually averaged lower boarding tuition prices than schools in other quintiles. Moreover, when correlation tests were run, boarding tuition was negatively correlated with the ratio of total endowment to total income while day tuition had a very weak positive correlation to the same ratio.

For the years 2003 to 2013, the correlation between boarding tuition and the ratio of total endowment to total income, the Pearson correlation coefficient was -0.351 and significant; for day tuition over the same period the Pearson correlation coefficient was 0.013 and not significant. These coefficients are not far enough away from zero to suggest a direct linear connection between tuition price and the ratio of total endowment to total income; still, the ratio of total endowment to total income is a much better predictor of boarding tuition than it is day tuition.

Recommendations for Practice

The above conclusions suggest three obvious recommendations for practice in the independent school world.

First, schools wishing to increase the number of students for whom they provide financial aid should work very hard to increase the proportion of total income generated by annual giving, striving to provide 10% of their income by annual giving. This recommendation is at odds with recommendations by Independent School Management that schools should set their tuition prices in order to raise all of the money necessary for income and to only raise money for capital campaigns and not annual budget needs (Independent School Management, 2007). Still, the findings in this study are clear when it comes to financial aid and the ratio of total annual giving to total income: the greater the ratio, the higher the percentage of students on financial aid[26]. In fact, schools that decide to focus on maximizing annual giving proceeds would be following Proctor's (2010) observations that spendable income can often times be more important than a substantial endowment.

Secondly, and as a corollary to the above suggestion, schools would do well to explore the long-term and immediate effects of raising money for endowments versus raising and re-raising money each year in annual giving. While endowments may raise a school's brand and project a sense of permanence, healthy returns from annual giving translate directly into providing financial aid to larger percentages of students. Schools need to decide which form of giving to prioritize over the other: for instance, schools could favor annual giving while dispatching key development officers to focus on endowment growth through primarily planned giving.

[26] One could, of course, argue that the ratio of annual giving to total income must approach or exceed 10% in schools that carry a large percentage of their students on financial aid and thus, the higher ratios are merely a consequence of higher percentages of students on financial aid. Certainly the relationship works both ways. But, as a guideline for practice, if a school has a low ratio of annual giving to total income and wants to find a way to offer more financial aid, increasing the income from annual giving is an obvious first step to take.

Third, the study highlights differences in financial aid and tuition growth practices between day and boarding schools. The issues of access and affordability that have confronted the independent school world for the last 20 years are not likely to recede any time soon. Thus, schools should decide how much they wish to commit themselves to providing access and affordability—e.g., whether through moderated tuition price, financial aid, or some combination of the two—now and over the next decade and then develop a long term financial plan and strategy that calls for a mixture of tuition increases, annual giving increase and an increase in financial aid allotment.

Limitations

There are numerous limitations with the dataset from NAIS. In some instances, schools didn't report key demographic data such as School Type, Gender Code or Class Code. In other instances, schools did not report data for each of the eleven years. And in still other instances, schools reported data incorrectly. In order to control for these issues with the dataset, schools that did not report key demographic variables were excluded from the study. In other instances, averages for tuition price or financial aid were calculated for schools that provided a minimum of seven years worth of data. And in cases where data was obviously erroneous—for instance, if a financial aid proportion was greater than one—those data points were excluded from analysis.

The research questions in this study noticeably did not take geography into account. There are substantial differences in the cost of living from state to state and from geographical region to geographical region in this country.

Beyond the above limitations with the dataset, working with such a large dataset necessitated analysis that focused largely on global trends and relationships. Only data reported by schools was used in this study. Thus, it is not possible to identify factors outside the independent school

world that have an impact on tuition price or the number of students on financial aid. In several instances, it appears that changes in tuition price and the financial aid percentages occurred just after the 2008-2009 school year. One naturally wonders if this was due in part to the financial crisis that also occurred at that same time. But one could also surmise that such changes were warranted because of other long-standing systemic economic problems such as stagnant wages. These are intriguing questions but they can't be answered given that this study focused solely on internal independent school metrics.

Finally, this is a quantitative study done with preexisting data. Conclusions drawn can only be inferred from the results of data analysis; it is impossible to know from this study whether or not stakeholders have engaged in decision-making directed at producing some of the results found—for instance, do boarding schools actively decide to provide financial aid to a higher percentage of students than day schools or has this fact developed merely out of necessity given that boarding tuition is substantially higher than day tuition? Likewise, one cannot know the reasons behind the increase dramatic increase in the percentage of students on financial aid from 2003 to 2013—one can only wonder if this was in response to an economic crisis, stagnate wages or perhaps a collective desire on the part of schools to increase the percentage of students for whom they provide financial aid.

Suggestions for Further Research

The findings in this study were drawn from working with a dataset of 1,979 schools distributed across the United States. Schools were stratified by School Type, Class Code and important economic factors such as annual giving, total endowment, total income and the ratios among those variables. However, given the differences in costs of living from one region of a country to another, it is possible and probable that geographic factors could play a role in the

issues explored in this study. Thus, the results of this study should be interrogated against a breakdown of schools by geographical region. The NAIS dataset already provides a geographic region code, so one could simplify double stratify, first for geographical location and then for the variables stratified in this study. For instance, did the percentage of students on financial aid increase in the same way across all geographical regions? Or did tuition grow at the same rate across geographic regions? One could also investigate the same research questions but this time with respect to age of school, another variable included in the NAIS dataset.

Next, there are places in the dataset where schools have not entered data for certain variables, or even for all variables across a given year or several years. To correct for this, when computing averages of variables across years, averages were only computed for schools that provided seven or more years worth of data for that variable. Given this, there are some obvious ways that a quantitative study can follow directly from this study and explore many of the same questions by selecting a random subset of schools based on School Type and then following up with each school directly in order to fill in missing pieces of the data set. From there, one could go on to attempt to reproduce the results of this study with a smaller, more complete data set.

Qualitative research could be used to explore some of the results of this study. For instance, it would be interesting to capture the thought process and decision making behind the differences in tuition (day and boarding) growth at schools with a substantial boarding population versus schools with a smaller (or nonexistent) boarding population.

Finally, given the obvious differences in practice versus advice from Independent School Management when it comes to the connection between annual giving and financial aid, qualitative research into the way in which school stakeholders receive the advice given by

Independent School Management and how they understand and use the tools at their disposal (tuition price, annual giving, endowment) would prove enlightening.

The independent school world in America has a strong history that closely parallels the development of non-profit institutions in the United States. Developing a better understanding of independent schools is beneficial not just for the independent school world but for the larger American non-profit world as well.

Public Engagement

As part of my data sharing agreement with NAIS, I will provide them with a copy of this dissertation. I will also share this dissertation with the individuals who participated in my cognitive interviews that helped me determine what variables to request data on from NAIS. If NAIS would like to follow-up with me on the findings and suggestions in this dissertation, I will be happy to work with them and provide them with more information or even conduct follow-up research if requested.

APPENDIX A. DAY TUITION BY SCHOOL TYPE, 2003–2013

Appendix A.1

ANOVA Average Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2114121619	2	1057060809	25.559	0.000
Within Groups	28950636799	700	41358052.57		
Total	31064758418	702			

Sidak Comparisons for Average Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	4504.771*	1229.604
Boarding-Day vs. Day	6187.589*	877.911
Day-Boarding vs. Day	1682.818	938.449

* The mean difference is significant at the 0.05 level.

Appendix A.2

ANOVA 2003 Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1279748134	2	639874066.9	22.022	0.000
Within Groups	18741506775	645	29056599.65		
Total	20021254909	647			

Sidak Comparisons for 2003 Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	3478.329*	1068.283
Boarding-Day vs. Day	5033.429*	775.535
Day-Boarding vs. Day	1555.1	803.871

* The mean difference is significant at the 0.05 level.

Appendix A.3

ANOVA 2004 Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1402103070	2	701051535	22.704	0.000
Within Groups	20132574657	652	30878181.99		
Total	21534677727	654			

Sidak Comparisons for 2004 Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	3757.560*	1091.599
Boarding-Day vs. Day	5211.947*	785.787
Day-Boarding vs. Day	1454.387	828.376

* The mean difference is significant at the 0.05 level.

Appendix A.4

ANOVA 2005 Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1667318551	2	833659275.4	24.477	0.000
Within Groups	23398875968	687	34059499.23		
Total	25066194519	689			

Sidak Comparisons for 2005 Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	3770.841*	1129.619
Boarding-Day vs. Day	5571.474*	816.472
Day-Boarding vs. Day	1800.632	852.206

* The mean difference is significant at the 0.05 level.

Appendix A.5

ANOVA 2006 Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1519429265	2	759714632.5	20.639	0.000
Within Groups	25103830185	682	36809135.17		
Total	26623259449	684			

Sidak Comparisons for 2006 Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	3966.762*	1190.067
Boarding-Day vs. Day	5493.316*	870.555
Day-Boarding vs. Day	1526.554	886.06

* The mean difference is significant at the 0.05 level.

Appendix A.6

ANOVA 2007 Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1742897738	2	871448869.2	22.245	0.000
Within Groups	26913029396	687	39174715.28		
Total	28655927134	689			

Sidak Comparisons for 2007 Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	4083.655*	1234.885
Boarding-Day vs. Day	5815.880*	890.053
Day-Boarding vs. Day	1732.225	930.71

* The mean difference is significant at the 0.05 level.

Appendix A.7

ANOVA 2008 Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2021934784	2	1010967392	24.308	0.000
Within Groups	28779956390	692	41589532.36		
Total	30801891173	694			

Sidak Comparisons for 2008 Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	4512.030*	1249.573
Boarding-Day vs. Day	6151.348*	894.635
Day-Boarding vs. Day	1639.318	950.011

* The mean difference is significant at the 0.05 level.

Appendix A.8

ANOVA 2009 Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2309105316	2	1154552658	26.496	0.000
Within Groups	30240225696	694	43573812.24		
Total	32549331012	696			

Sidak Comparisons for 2009 Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	4968.510*	1284.36
Boarding-Day vs. Day	6637.355*	922.948
Day-Boarding vs. Day	1668.845	972.217

* The mean difference is significant at the 0.05 level.

Appendix A.9

ANOVA 2010 Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2941994154	2	1470997077	29.863	0.000
Within Groups	34136160902	693	49258529.44		
Total	37078155057	695			

Sidak Comparisons for 2010 Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	5567.568*	1361.823
Boarding-Day vs. Day	7386.751*	965.876
Day-Boarding vs. Day	1819.184	1043.507

* The mean difference is significant at the 0.05 level.

Appendix A.10

ANOVA 2011 Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2235667902	2	1117833951	21.829	0.000
Within Groups	34873183491	681	51208786.33		
Total	37108851393	683			

Sidak Comparisons for 2011 Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	4890.571*	1404.452
Boarding-Day vs. Day	6630.283*	1018.136
Day-Boarding vs. Day	1739.712	1054.735

* The mean difference is significant at the 0.05 level.

Appendix A.11

ANOVA 2012 Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1972990896	2	986495448.1	19.065	0.000
Within Groups	34202046150	661	51742883.74		
Total	36175037046	663			

Sidak Comparisons for 2012 Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	4412.282*	1447.746
Boarding-Day vs. Day	6303.751*	1042.418
Day-Boarding vs. Day	1891.468	1092.013

* The mean difference is significant at the 0.05 level.

Appendix A.12

ANOVA 2013 Day Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1945797046	2	972898522.8	17.808	0.000
Within Groups	35839718820	656	54633717.71		
Total	37785515865	658			

Sidak Comparisons for 2013 Day Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding-Day vs. Day-Boarding	4553.593*	1493.301
Boarding-Day vs. Day	6428.202*	1101.072
Day-Boarding vs. Day	1874.608	1101.072

* The mean difference is significant at the 0.05 level.

APPENDIX B. BOARDING TUITION BY SCHOOL TYPE, 2003–2013

Appendix B.1

ANOVA Average Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	332061501.4	2	166030750.7	4.468	0.013
Within Groups	4681857310	126	37157597.7		
Total	5013918811	128			

Sidak Comparisons for Average Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-1370.534	1973.333
Boarding vs. Day-Boarding	2068.997	2045.907
Boarding-Day vs. Day-Boarding	3439.532*	1150.588

* The mean difference is significant at the 0.05 level.

Appendix B.2

ANOVA 2003 Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	194385944.6	2	97192972.31	2.710	0.071
Within Groups	4196049035	117	35863666.97		
Total	4390434980	119			

Sidak Comparisons for 2003 Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-1622.914	1950.313
Boarding vs. Day-Boarding	1087.855	2023.455
Boarding-Day vs. Day-Boarding	2710.768	1173.639

* The mean difference is significant at the 0.05 level.

Appendix B.3

ANOVA 2004 Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	232254020.2	2	116127010.1	3.251	0.042
Within Groups	4322488912	121	35723048.86		
Total	4554742932	123			

Sidak Comparisons for 2004 Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-954.931	1940.432
Boarding vs. Day-Boarding	1982.954	2014.805
Boarding-Day vs. Day-Boarding	2937.885*	1153.088

* The mean difference is significant at the 0.05 level.

Appendix B.4

ANOVA 2005 Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	285187734.4	2	142593867.2	3.991	0.021
Within Groups	4465925257	125	35727402.06		
Total	4751112992	127			

Sidak Comparisons for 2005 Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-873.437	1936.788
Boarding vs. Day-Boarding	2314.735	2006.148
Boarding-Day vs. Day-Boarding	3188.172*	1131.32

* The mean difference is significant at the 0.05 level.

Appendix B.5

ANOVA 2006 Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	295375212.9	2	147687606.4	4.021	0.020
Within Groups	4480933874	122	36728966.18		
Total	4776309087	124			

Sidak Comparisons for 2006 Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-1129.937	2050.659
Boarding vs. Day-Boarding	2139.84	2114.557
Boarding-Day vs. Day-Boarding	3269.777*	1153.586

* The mean difference is significant at the 0.05 level.

Appendix B.6

ANOVA 2007 Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	309204607.8	2	154602303.9	4.340	0.015
Within Groups	4345792326	122	35621248.58		
Total	4654996934	124			

Sidak Comparisons for 2007 Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-1121.785	1937.665
Boarding vs. Day-Boarding	2245.204	2007.456
Boarding-Day vs. Day-Boarding	3366.989*	1143.605

* The mean difference is significant at the 0.05 level.

Appendix B.7

ANOVA 2008 Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	365075223.3	2	182537611.7	4.993	0.008
Within Groups	4459874425	122	36556347.74		
Total	4824949648	124			

Sidak Comparisons for 2008 Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-824.75	2141.039
Boarding vs. Day-Boarding	2786.458	2203.751
Boarding-Day vs. Day-Boarding	3611.207*	1147.579

* The mean difference is significant at the 0.05 level.

Appendix B.8

ANOVA 2009 Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	419551257.8	2	209775628.9	4.988	0.008
Within Groups	5257132788	125	42057062.31		
Total	5676684046	127			

Sidak Comparisons for 2009 Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-1229.943	2101.362
Boarding vs. Day-Boarding	2642.91	2176.615
Boarding-Day vs. Day-Boarding	3872.853*	1227.451

* The mean difference is significant at the 0.05 level.

Appendix B.9

ANOVA 2010 Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	332542221.7	2	166271110.8	3.925	0.022
Within Groups	5294768549	125	42358148.39		
Total	5627310770	127			

Sidak Comparisons for 2010 Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-1110.787	2106.905
Boarding vs. Day-Boarding	2351.976	2189.071
Boarding-Day vs. Day-Boarding	3462.763*	1236.77

* The mean difference is significant at the 0.05 level.

Appendix B.10

ANOVA 2011 Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	282338033.4	2	141169016.7	3.344	0.039
Within Groups	5235350119	124	42220565.47		
Total	5517688152	126			

Sidak Comparisons for 2011 Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-1143.993	2105.443
Boarding vs. Day-Boarding	2057.144	2185.513
Boarding-Day vs. Day-Boarding	3201.137*	1238.1

* The mean difference is significant at the 0.05 level.

Appendix B.11

ANOVA 2012 Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	368954509.7	2	184477254.8	3.751	0.026
Within Groups	5803047240	118	49178366.44		
Total	6172001750	120			

Sidak Comparisons for 2012 Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-1644.267	2372.881
Boarding vs. Day-Boarding	2112.642	2467.539
Boarding-Day vs. Day-Boarding	3756.909*	1372.459

* The mean difference is significant at the 0.05 level.

Appendix B.12

ANOVA 2013 Boarding Tuition by School Type

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	341947938.9	2	170973969.4	3.324	0.040
Within Groups	5708704895	111	51429773.83		
Total	6050652834	113			

Sidak Comparisons for 2013 Boarding Tuition by School Type

Comparisons	Mean Difference	Std. Error
Boarding vs. Boarding-Day	-865.05	2689.296
Boarding vs. Day-Boarding	2793.409	2766.449
Boarding-Day vs. Day-Boarding	3658.460*	1424.117

* The mean difference is significant at the 0.05 level.

APPENDIX C. DAY TUITION BY CLASS CODE, 2003–2013

Appendix C.1

ANOVA Average Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2341459987	2	1170729994	28.553	0.000
Within Groups	2878390016 7	702	41002706.7 9		
Total	3112536015 4	704			

Sidak Comparisons for Average Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-5860.846*	775.623
Elem. vs. Both Elem. and Secondary	-1740.899*	533.022
Secondary vs. Both Elem. & Secondary	4119.948*	732.628

* The mean difference is significant at the 0.05 level.

Appendix C.2

ANOVA 2003 Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1505141678	2	752570838.9	26.234	0.000
Within Groups	18560683876	647	28687301.2		
Total	20065825554	649			

Sidak Comparisons for 2003 Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-4875.623*	679.198
Elem. vs. Both Elem. and Secondary	-1837.946*	466.134
Secondary vs. Both Elem. & Secondary	3037.677*	638.714

* The mean difference is significant at the 0.05 level.

Appendix C.3

ANOVA 2004 Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1554390888	2	777195444.1	25.381	0.000
Within Groups	20026015354	654	30620818.58		
Total	21580406242	656			

Sidak Comparisons for 2004 Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-4935.982*	693.491
Elem. vs. Both Elem. and Secondary	-1621.136*	480.559
Secondary vs. Both Elem. & Secondary	3314.846*	650.378

* The mean difference is significant at the 0.05 level.

Appendix C.4

ANOVA 2005 Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1926548939	2	963274469.6	28.604	0.000
Within Groups	23202798007	689	33676049.36		
Total	25129346946	691			

Sidak Comparisons for 2005 Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-5374.586*	712.665
Elem. vs. Both Elem. and Secondary	-1798.058*	487.129
Secondary vs. Both Elem. & Secondary	3576.529*	673.512

* The mean difference is significant at the 0.05 level.

Appendix C.5

ANOVA 2006 Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1806359335	2	903179667.6	24.830	0.000
Within Groups	24879808141	684	36373988.51		
Total	26686167477	686			

Sidak Comparisons for 2006 Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-5248.786*	746.902
Elem. vs. Both Elem. and Secondary	-1730.350*	507.474
Secondary vs. Both Elem. & Secondary	3518.437*	706.468

* The mean difference is significant at the 0.05 level.

Appendix C.6

ANOVA 2007 Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2025098201	2	1012549101	26.133	0.000
Within Groups	26696262155	689	38746389.19		
Total	28721360356	691			

Sidak Comparisons for 2007 Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-5551.396*	770.401
Elem. vs. Both Elem. and Secondary	-1845.964*	521.971
Secondary vs. Both Elem. & Secondary	3705.432*	728.357

* The mean difference is significant at the 0.05 level.

Appendix C.7

ANOVA 2008 Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2267379152	2	1133689576	27.507	0.000
Within Groups	28602489642	694	41213962.02		
Total	30869868794	696			

Sidak Comparisons for 2008 Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-5843.840*	787.913
Elem. vs. Both Elem. and Secondary	-1637.594*	537.063
Secondary vs. Both Elem. & Secondary	4206.246*	744.279

* The mean difference is significant at the 0.05 level.

Appendix C.8

ANOVA 2009 Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2449788074	2	1224894037	28.264	0.000
Within Groups	30162648665	696	43337138.89		
Total	32612436739	698			

Sidak Comparisons for 2009 Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-6067.196*	806.965
Elem. vs. Both Elem. and Secondary	-1718.770*	549.271
Secondary vs. Both Elem. & Secondary	4348.426*	763.209

* The mean difference is significant at the 0.05 level.

Appendix C.9

ANOVA 2010 Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2889074004	2	1444537002	29.310	0.000
Within Groups	34253049924	695	49284963.92		
Total	37142123928	697			

Sidak Comparisons for 2010 Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-6590.737*	861.615
Elem. vs. Both Elem. and Secondary	-1710.655*	586.998
Secondary vs. Both Elem. & Secondary	4880.083*	813.681

* The mean difference is significant at the 0.05 level.

Appendix C.10

ANOVA 2011 Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2618534375	2	1309267188	25.879	0.000
Within Groups	34554783431	683	50592655.1		
Total	37173317806	685			

Sidak Comparisons for 2011 Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-6311.116*	877.433
Elem. vs. Both Elem. and Secondary	-1722.140*	599.132
Secondary vs. Both Elem. & Secondary	4588.976*	830.007

* The mean difference is significant at the 0.05 level.

Appendix C.11

ANOVA 2012 Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2349582225	2	1174791112	22.983	0.000
Within Groups	33889933260	663	51116038.1		
Total	36239515485	665			

Sidak Comparisons for 2012 Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-6048.529*	893.425
Elem. vs. Both Elem. and Secondary	-1542.952*	612.085
Secondary vs. Both Elem. & Secondary	4505.576*	844.009

* The mean difference is significant at the 0.05 level.

Appendix C.12

ANOVA 2013 Day Tuition by Class Code

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2211243276	2	1105621638	20.420	0.000
Within Groups	35626550738	658	54143694.13		
Total	37837794014	660			

Sidak Comparisons for 2013 Day Tuition by Class Code

Comparisons	Mean Difference	Std. Error
Elementary vs. Secondary	-5907.042*	924.372
Elem. vs. Both Elem. and Secondary	-1665.256*	632.396
Secondary vs. Both Elem. & Secondary	4241.786*	873.025

* The mean difference is significant at the 0.05 level.

APPENDIX D. DAY TUITION BY PROPORTION OF STUDENTS RECEIVING FINANCIAL AID, 2003–2013

Appendix D.1

ANOVA Average Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	901858783	4	225464695.7	5.222	0.000
Within Groups	30223501371	700	43176430.53		
Total	31125360154	704			

Sidak Comparisons for Average Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2322.571*	782.58
1 vs. 3	-2834.806*	782.58
1 vs. 4	-3279.311*	782.58
1 vs. 5	-2020.806	782.58
2 vs. 3	-512.235	782.58
2 vs. 4	-956.74	782.58
2 vs. 5	301.764	782.58
3 vs. 4	-444.505	782.58
3 vs. 4	813.999	782.58
4 vs. 5	1258.504	782.58

* The mean difference is significant at the 0.05 level.

Appendix D.2

ANOVA 2003 Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	697045693.9	4	174261423.5	5.803	0.000
Within Groups	19368779860	645	30029116.06		
Total	20065825554	649			

Sidak Comparisons for 2003 Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2198.006*	673.258
1 vs. 3	-2303.954*	674.546
1 vs. 4	-3081.164*	679.877
1 vs. 5	-2138.785*	679.877
2 vs. 3	-105.948	675.813
2 vs. 4	-883.159	681.134
2 vs. 5	59.22	681.134
3 vs. 4	-777.21	682.407
3 vs. 4	165.169	682.407
4 vs. 5	942.379	687.677

* The mean difference is significant at the 0.05 level.

Appendix D.3

ANOVA 2004 Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	536431314.2	4	134107828.6	4.155	0.002
Within Groups	21043974928	652	32276035.17		
Total	21580406242	656			

Sidak Comparisons for 2004 Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-1968.566	703.361
1 vs. 3	-2119.542*	706.03
1 vs. 4	-2680.142*	698.23
1 vs. 5	-1783.195	706.03
2 vs. 3	-150.975	701.992
2 vs. 4	-711.576	694.146
2 vs. 5	185.371	701.992
3 vs. 4	-560.601	696.851
3 vs. 4	336.346	704.666
4 vs. 5	896.947	696.851

* The mean difference is significant at the 0.05 level.

Appendix D.4

ANOVA 2005 Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	780901835	4	195225458.8	5.508	0.000
Within Groups	24348445111	687	35441695.94		
Total	25129346946	691			

Sidak Comparisons for 2005 Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2115.481*	711.555
1 vs. 3	-2681.390*	716.768
1 vs. 4	-3060.641*	712.833
1 vs. 5	-2027.131*	715.439
2 vs. 3	-565.908	716.768
2 vs. 4	-945.16	712.833
2 vs. 5	88.351	715.439
3 vs. 4	-379.251	718.037
3 vs. 4	654.259	720.624
4 vs. 5	1033.51	716.711

* The mean difference is significant at the 0.05 level.

Appendix D.5

ANOVA 2006 Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	767810453	4	191952613.2	5.051	0.001
Within Groups	25918357024	682	38003456.05		
Total	26686167477	686			

Sidak Comparisons for 2006 Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2134.919*	736.822
1 vs. 3	-2719.856*	743.613
1 vs. 4	-2979.235*	739.487
1 vs. 5	-1744.194	745.024
2 vs. 3	-584.937	743.613
2 vs. 4	-844.316	739.487
2 vs. 5	390.726	745.024
3 vs. 4	-259.379	746.254
3 vs. 4	975.662	751.741
4 vs. 5	1235.041	747.66

* The mean difference is significant at the 0.05 level.

Appendix D.6

ANOVA 2007 Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	877741829.2	4	219435457.3	5.414	0.000
Within Groups	27843618526	687	40529284.61		
Total	28721360356	691			

Sidak Comparisons for 2007 Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2396.044*	762.32
1 vs. 3	-2790.928*	760.933
1 vs. 4	-3213.166*	763.725
1 vs. 5	-1821.482	763.725
2 vs. 3	-394.884	765.028
2 vs. 4	-817.122	767.805
2 vs. 5	574.562	767.805
3 vs. 4	-422.238	766.428
3 vs. 4	969.446	766.428
4 vs. 5	1391.684	769.2

* The mean difference is significant at the 0.05 level.

Appendix D.7

ANOVA 2008 Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	886924315.9	4	221731079	5.118	0.000
Within Groups	29982944478	692	43327954.45		
Total	30869868794	696			

Sidak Comparisons for 2008 Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2454.430*	788.161
1 vs. 3	-2629.613*	788.161
1 vs. 4	-3314.459*	786.747
1 vs. 5	-1854.694	788.161
2 vs. 3	-175.183	789.572
2 vs. 4	-860.029	788.161
2 vs. 5	599.736	789.572
3 vs. 4	-684.845	788.161
3 vs. 4	774.919	789.572
4 vs. 5	1459.764	788.161

* The mean difference is significant at the 0.05 level.

Appendix D.8

ANOVA 2009 Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	852026838.2	4	213006709.6	4.654	0.001
Within Groups	31760409901	694	45764279.4		
Total	32612436739	698			

Sidak Comparisons for 2009 Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2281.230*	808.584
1 vs. 3	-2737.893*	808.584
1 vs. 4	-3225.723*	810.017
1 vs. 5	-2019.296	812.936
2 vs. 3	-456.664	805.691
2 vs. 4	-944.493	807.129
2 vs. 5	261.934	810.058
3 vs. 4	-487.83	807.129
3 vs. 4	718.598	810.058
4 vs. 5	1206.427	811.488

* The mean difference is significant at the 0.05 level.

Appendix D.9

ANOVA 2010 Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	974090629.9	4	243522657.5	4.666	0.001
Within Groups	36168033298	693	52190524.24		
Total	37142123928	697			

Sidak Comparisons for 2010 Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2519.498*	865.021
1 vs. 3	-2848.332*	861.937
1 vs. 4	-3462.286*	863.469
1 vs. 5	-2206.835	866.592
2 vs. 3	-328.834	863.491
2 vs. 4	-942.788	865.021
2 vs. 5	312.663	868.138
3 vs. 4	-613.953	861.937
3 vs. 4	641.497	865.065
4 vs. 5	1255.45	866.592

* The mean difference is significant at the 0.05 level.

Appendix D.10

ANOVA 2011 Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1132471081	4	283117770.3	5.350	0.000
Within Groups	36040846725	681	52923416.63		
Total	37173317806	685			

Sidak Comparisons for 2011 Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2646.950*	880.594
1 vs. 3	-3340.833*	877.386
1 vs. 4	-3628.657*	877.386
1 vs. 5	-2202.518	878.979
2 vs. 3	-693.883	879.003
2 vs. 4	-981.706	879.003
2 vs. 5	444.432	880.594
3 vs. 4	-287.824	875.789
3 vs. 4	1138.315	877.386
4 vs. 5	1426.138	877.386

* The mean difference is significant at the 0.05 level.

Appendix D.11

ANOVA 2012 Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1071803024	4	267950755.9	5.036	0.001
Within Groups	35167712461	661	53203801		
Total	36239515485	665			

Sidak Comparisons for 2012 Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2669.619*	889.464
1 vs. 3	-3281.615*	896.203
1 vs. 4	-3570.539*	886.224
1 vs. 5	-2295.954	899.709
2 vs. 3	-611.997	894.56
2 vs. 4	-900.92	884.563
2 vs. 5	373.665	898.073
3 vs. 4	-288.923	891.339
3 vs. 4	985.662	904.748
4 vs. 5	1274.585	894.864

* The mean difference is significant at the 0.05 level.

Appendix D.12

ANOVA 2013 Day Tuition by Financial Aid Proportion Quintiles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1288775753	4	322193938.1	5.783	0.000
Within Groups	36549018261	656	55714966.86		
Total	37837794014	660			

Sidak Comparisons for 2013 Day Tuition by Quintiles of Proportion of Students on Financial Aid

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-3048.555*	913.615
1 vs. 3	-3843.378*	915.35
1 vs. 4	-3654.371*	917.109
1 vs. 5	-2370.725	917.109
2 vs. 3	-794.823	917.056
2 vs. 4	-605.816	918.812
2 vs. 5	677.83	918.812
3 vs. 4	189.008	920.537
3 vs. 4	1472.653	920.537
4 vs. 5	1283.645	922.285

* The mean difference is significant at the 0.05 level.

APPENDIX E. DAY TUITION BY THE RATIO OF TOTAL ANNUAL GIVING TO TOTAL INCOME, 2003–2013

Appendix E.1

ANOVA Average Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3545137672	4	886284418.1	22.494	0.000
Within Groups	27580222482	700	39400317.83		
Total	31125360154	704			

Sidak Comparisons for Average Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2383.959*	747.576
1 vs. 3	-3065.177*	747.576
1 vs. 4	-5155.992*	747.576
1 vs. 5	-6458.706*	747.576
2 vs. 3	-681.217	747.576
2 vs. 4	-2772.032*	747.576
2 vs. 5	-4074.747*	747.576
3 vs. 4	-2090.815	747.576
3 vs. 4	-3393.530*	747.576
4 vs. 5	-1302.715	747.576

* The mean difference is significant at the 0.05 level.

Appendix E.2

ANOVA 2003 Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2260436954	4	565109238.4	20.471	0.000
Within Groups	17805388600	645	27605253.64		
Total	20065825554	649			

Sidak Comparisons for 2003 Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-1944.782*	659.36
1 vs. 3	-2252.563*	654.385
1 vs. 4	-3883.247*	651.996
1 vs. 5	-5550.850*	656.839
2 vs. 3	-307.781	651.764
2 vs. 4	-1938.465*	649.365
2 vs. 5	-3606.067*	654.228
3 vs. 4	-1630.684	644.314
3 vs. 4	-3298.287*	649.214
4 vs. 5	-1667.603	646.806

* The mean difference is significant at the 0.05 level.

Appendix E.3

ANOVA 2004 Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2513951171	4	628487792.7	21.492	0.000
Within Groups	19066455071	652	29243029.25		
Total	21580406242	656			

Sidak Comparisons for 2004 Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2122.522*	674.649
1 vs. 3	-2507.789*	664.614
1 vs. 4	-4388.189*	669.499
1 vs. 5	-5708.106*	669.499
2 vs. 3	-385.267	665.946
2 vs. 4	-2265.667*	670.82
2 vs. 5	-3585.584*	670.82
3 vs. 4	-1880.400*	660.727
3 vs. 4	-3200.317*	660.727
4 vs. 5	-1319.917	665.64

* The mean difference is significant at the 0.05 level.

Appendix E.4

ANOVA 2005 Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3019195771	4	754798942.8	23.453	0.000
Within Groups	22110151175	687	32183626.16		
Total	25129346946	691			

Sidak Comparisons for 2005 Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2094.256*	679.314
1 vs. 3	-2858.806*	678.078
1 vs. 4	-4729.466*	681.834
1 vs. 5	-5993.772*	679.314
2 vs. 3	-764.55	681.727
2 vs. 4	-2635.209*	685.463
2 vs. 5	-3899.515*	682.956
3 vs. 4	-1870.659	684.238
3 vs. 4	-3134.966*	681.727
4 vs. 5	-1264.306	685.463

* The mean difference is significant at the 0.05 level.

Appendix E.5

ANOVA 2006 Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3026824726	4	756706181.5	21.813	0.000
Within Groups	23659342751	682	34691118.4		
Total	26686167477	686			

Sidak Comparisons for 2006 Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2133.911*	710.355
1 vs. 3	-2925.373*	709.063
1 vs. 4	-4560.182*	712.991
1 vs. 5	-6137.565*	707.786
2 vs. 3	-791.462	710.355
2 vs. 4	-2426.271*	714.277
2 vs. 5	-4003.654*	709.081
3 vs. 4	-1634.809	712.991
3 vs. 4	-3212.192*	707.786
4 vs. 5	-1577.383	711.722

* The mean difference is significant at the 0.05 level.

Appendix E.6

ANOVA 2007 Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3250086578	4	812521644.6	21.915	0.000
Within Groups	25471273777	687	37076089.92		
Total	28721360356	691			

Sidak Comparisons for 2007 Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2162.986*	729.084
1 vs. 3	-2969.509*	734.406
1 vs. 4	-4895.935*	733.05
1 vs. 5	-6219.643*	729.084
2 vs. 3	-806.523	733.108
2 vs. 4	-2732.949*	731.75
2 vs. 5	-4056.658*	727.776
3 vs. 4	-1926.426	737.053
3 vs. 4	-3250.135*	733.108
4 vs. 5	-1323.708	731.75

* The mean difference is significant at the 0.05 level.

Appendix E.7

ANOVA 2008 Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3588832338	4	897208084.5	22.758	0.000
Within Groups	27281036456	692	39423463.09		
Total	30869868794	696			

Sidak Comparisons for 2008 Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2228.228*	750.461
1 vs. 3	-3105.430*	753.176
1 vs. 4	-5138.060*	751.81
1 vs. 5	-6501.115*	750.461
2 vs. 3	-877.202	753.176
2 vs. 4	-2909.832*	751.81
2 vs. 5	-4272.886*	750.461
3 vs. 4	-2032.63	754.519
3 vs. 4	-3395.684*	753.176
4 vs. 5	-1363.054	751.81

* The mean difference is significant at the 0.05 level.

Appendix E.8

ANOVA 2009 Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3630303540	4	907575885	21.733	0.000
Within Groups	28982133199	694	41760998.85		
Total	32612436739	698			

Sidak Comparisons for 2009 Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2416.771*	773.778
1 vs. 3	-3027.536*	772.409
1 vs. 4	-5272.113*	773.778
1 vs. 5	-6550.739*	775.163
2 vs. 3	-610.765	771.019
2 vs. 4	-2855.341*	772.39
2 vs. 5	-4133.967*	773.778
3 vs. 4	-2244.577*	771.019
3 vs. 4	-3523.203*	772.409
4 vs. 5	-1278.626	773.778

* The mean difference is significant at the 0.05 level.

Appendix E.9

ANOVA 2010 Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4109143636	4	1027285909	21.551	0.000
Within Groups	33032980292	693	47666638.23		
Total	37142123928	697			

Sidak Comparisons for 2010 Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2579.071*	823.734
1 vs. 3	-3332.072*	825.219
1 vs. 4	-5690.818*	823.734
1 vs. 5	-6918.300*	826.723
2 vs. 3	-753.001	826.681
2 vs. 4	-3111.747*	825.198
2 vs. 5	-4339.229*	828.183
3 vs. 4	-2358.746*	826.681
3 vs. 4	-3586.228*	829.66
4 vs. 5	-1227.482	828.183

* The mean difference is significant at the 0.05 level.

Appendix E.10

ANOVA 2011 Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4310860461	4	1077715115	22.333	0.000
Within Groups	32862457346	681	48256178.19		
Total	37173317806	685			

Sidak Comparisons for 2011 Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2719.456*	837.849
1 vs. 3	-3526.045*	840.868
1 vs. 4	-5842.903*	839.349
1 vs. 5	-7231.407*	842.407
2 vs. 3	-806.588	836.302
2 vs. 4	-3123.447*	834.775
2 vs. 5	-4511.951*	837.849
3 vs. 4	-2316.859	837.805
3 vs. 4	-3705.362*	840.868
4 vs. 5	-1388.504	839.349

* The mean difference is significant at the 0.05 level.

Appendix E.11

ANOVA 2012 Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4257710700	4	1064427675	22.000	0.000
Within Groups	31981804784	661	48383970.93		
Total	36239515485	665			

Sidak Comparisons for 2012 Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-2568.917*	840.527
1 vs. 3	-3627.490*	849.817
1 vs. 4	-5829.319*	849.817
1 vs. 5	-7302.837*	861.626
2 vs. 3	-1058.573	843.727
2 vs. 4	-3260.402*	843.727
2 vs. 5	-4733.921*	855.62
3 vs. 4	-2201.828	852.982
3 vs. 4	-3675.347*	864.748
4 vs. 5	-1473.519	864.748

* The mean difference is significant at the 0.05 level.

Appendix E.12

ANOVA 2013 Day Tuition by Ratio of Total Annual Giving to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4301888334	4	1075472083	21.037	0.000
Within Groups	33535905680	656	51121807.44		
Total	37837794014	660			

Sidak Comparisons for 2013 Day Tuition by Quintiles of Ratio of Total Annual Giving to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-3196.825*	883.477
1 vs. 3	-3815.512*	875.441
1 vs. 4	-5931.708*	880.199
1 vs. 5	-7577.871*	890.3
2 vs. 3	-618.687	872.031
2 vs. 4	-2734.883*	876.808
2 vs. 5	-4381.045*	886.947
3 vs. 4	-2116.196	868.71
3 vs. 4	-3762.358*	878.943
4 vs. 5	-1646.163	883.683

* The mean difference is significant at the 0.05 level.

APPENDIX F. DAY TUITION BY THE RATIO OF TOTAL ENDOWMENT TO TOTAL INCOME, 2003–2013

Appendix F.1

ANOVA Average Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2574209218	4	643552304.5	15.778	0.000
Within Groups	28551150936	700	40787358.48		
Total	31125360154	704			

Sidak Comparisons for Average Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-527.75	760.621
1 vs. 3	-1367.867	760.621
1 vs. 4	-4388.587*	760.621
1 vs. 5	-4469.398*	760.621
2 vs. 3	-840.117	760.621
2 vs. 4	-3860.837*	760.621
2 vs. 5	-3941.648*	760.621
3 vs. 4	-3020.720*	760.621
3 vs. 4	-3101.531*	760.621
4 vs. 5	-80.811	760.621

* The mean difference is significant at the 0.05 level.

Appendix F.2

ANOVA 2003 Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1695657972	4	423914493	14.884	0.000
Within Groups	18370167582	645	28480879.97		
Total	20065825554	649			

Sidak Comparisons for 2003 Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-771.88	678.85
1 vs. 3	-1538.743	675.256
1 vs. 4	-3928.139*	676.438
1 vs. 5	-3949.752*	674.089
2 vs. 3	-766.862	655.71
2 vs. 4	-3156.259*	656.927
2 vs. 5	-3177.872*	654.508
3 vs. 4	-2389.396*	653.212
3 vs. 4	-2411.010*	650.779
4 vs. 5	-21.613	652.006

* The mean difference is significant at the 0.05 level.

Appendix F.3

ANOVA 2004 Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1747205240	4	436801310	14.359	0.000
Within Groups	19833201002	652	30419019.94		
Total	21580406242	656			

Sidak Comparisons for 2004 Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-477.5	695.657
1 vs. 3	-945.873	689.586
1 vs. 4	-3948.404*	698.201
1 vs. 5	-3560.860*	688.418
2 vs. 3	-468.373	672.669
2 vs. 4	-3470.903*	681.498
2 vs. 5	-3083.360*	671.472
3 vs. 4	-3002.530*	675.299
3 vs. 4	-2614.987*	665.18
4 vs. 5	387.543	674.107

* The mean difference is significant at the 0.05 level.

Appendix F.4

ANOVA 2005 Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2187202693	4	546800673.4	16.374	0.000
Within Groups	22942144253	687	33394678.68		
Total	25129346946	691			

Sidak Comparisons for 2005 Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-848.045	693.18
1 vs. 3	-1540.974	691.941
1 vs. 4	-4313.950*	695.706
1 vs. 5	-4270.976*	695.706
2 vs. 3	-692.93	691.941
2 vs. 4	-3465.905*	695.706
2 vs. 5	-3422.931*	695.706
3 vs. 4	-2772.975*	694.471
3 vs. 4	-2730.001*	694.471
4 vs. 5	42.974	698.222

* The mean difference is significant at the 0.05 level.

Appendix F.5

ANOVA 2006 Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2327379963	4	581844990.7	16.291	0.000
Within Groups	24358787514	682	35716697.23		
Total	26686167477	686			

Sidak Comparisons for 2006 Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-533.13	724.915
1 vs. 3	-1417.668	715.593
1 vs. 4	-4235.705*	720.817
1 vs. 5	-4347.987*	716.875
2 vs. 3	-884.538	723.648
2 vs. 4	-3702.575*	728.814
2 vs. 5	-3814.856*	724.915
3 vs. 4	-2818.037*	719.543
3 vs. 4	-2930.318*	715.593
4 vs. 5	-112.281	720.817

* The mean difference is significant at the 0.05 level.

Appendix F.6

ANOVA 2007 Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2425222492	4	606305623	15.840	0.000
Within Groups	26296137864	687	38276765.45		
Total	28721360356	691			

Sidak Comparisons for 2007 Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-591.554	740.834
1 vs. 3	-1368.7	740.834
1 vs. 4	-4386.502*	748.932
1 vs. 5	-4384.481*	746.164
2 vs. 3	-777.146	736.84
2 vs. 4	-3794.947*	744.982
2 vs. 5	-3792.927*	742.199
3 vs. 4	-3017.801*	744.982
3 vs. 4	-3015.781*	742.199
4 vs. 5	2.02	750.283

* The mean difference is significant at the 0.05 level.

Appendix F.7

ANOVA 2008 Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2594739962	4	648684990.6	15.876	0.000
Within Groups	28275128832	692	40860012.76		
Total	30869868794	696			

Sidak Comparisons for 2008 Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-408.546	762.656
1 vs. 3	-1504.979	766.835
1 vs. 4	-4379.758*	761.298
1 vs. 5	-4497.342*	765.424
2 vs. 3	-1096.434	768.183
2 vs. 4	-3971.212*	762.656
2 vs. 5	-4088.796*	766.775
3 vs. 4	-2874.778*	766.835
3 vs. 4	-2992.363*	770.931
4 vs. 5	-117.585	765.424

* The mean difference is significant at the 0.05 level.

Appendix F.8

ANOVA 2009 Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2540263438	4	635065859.6	14.656	0.000
Within Groups	30072173301	694	43331661.82		
Total	32612436739	698			

Sidak Comparisons for 2009 Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-539.896	785.384
1 vs. 3	-1518.249	786.801
1 vs. 4	-4478.415*	785.384
1 vs. 5	-4413.086*	786.801
2 vs. 3	-978.353	788.194
2 vs. 4	-3938.520*	786.781
2 vs. 5	-3873.191*	788.194
3 vs. 4	-2960.167*	788.194
3 vs. 4	-2894.838*	789.606
4 vs. 5	65.329	788.194

* The mean difference is significant at the 0.05 level.

Appendix F.9

ANOVA 2010 Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2831106810	4	707776702.4	14.295	0.000
Within Groups	34311017119	693	49510847.21		
Total	37142123928	697			

Sidak Comparisons for 2010 Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-540.728	842.521
1 vs. 3	-1468.661	842.521
1 vs. 4	-4589.020*	841.01
1 vs. 5	-4736.751*	841.01
2 vs. 3	-927.933	844.03
2 vs. 4	-4048.292*	842.521
2 vs. 5	-4196.023*	842.521
3 vs. 4	-3120.359*	842.521
3 vs. 4	-3268.090*	842.521
4 vs. 5	-147.731	841.01

* The mean difference is significant at the 0.05 level.

Appendix F.10

ANOVA 2011 Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3012710774	4	753177693.6	15.015	0.000
Within Groups	34160607032	681	50162418.55		
Total	37173317806	685			

Sidak Comparisons for 2011 Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	21.049	858.908
1 vs. 3	-1103.273	854.328
1 vs. 4	-4619.006*	858.908
1 vs. 5	-4508.593*	858.908
2 vs. 3	-1124.322	851.147
2 vs. 4	-4640.055*	855.744
2 vs. 5	-4529.642*	855.744
3 vs. 4	-3515.733*	851.147
3 vs. 4	-3405.320*	851.147
4 vs. 5	110.413	855.744

* The mean difference is significant at the 0.05 level.

Appendix F.11

ANOVA 2012 Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2941029524	4	735257380.9	14.595	0.000
Within Groups	33298485961	661	50375924.3		
Total	36239515485	665			

Sidak Comparisons for 2012 Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	170.337	862.303
1 vs. 3	-1241.378	863.892
1 vs. 4	-4633.345*	867.134
1 vs. 5	-4447.081*	877.391
2 vs. 3	-1411.715	862.303
2 vs. 4	-4803.683*	865.55
2 vs. 5	-4617.418*	875.826
3 vs. 4	-3391.967*	867.134
3 vs. 4	-3205.702*	877.391
4 vs. 5	186.265	880.583

* The mean difference is significant at the 0.05 level.

Appendix F.12

ANOVA 2013 Day Tuition by Ratio of Total Endowment to Total Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2716194045	4	679048511.3	12.683	0.000
Within Groups	35121599969	656	53539024.34		
Total	37837794014	660			

Sidak Comparisons for 2013 Day Tuition by Quintiles of Ratio of Total Endowment to Toal Income

Quintile Comparisons	Mean Difference	Std. Error
1 vs. 2	-109.538	907.808
1 vs. 3	-1139.105	902.904
1 vs. 4	-4558.900*	904.518
1 vs. 5	-4401.882*	912.911
2 vs. 3	-1029.567	892.311
2 vs. 4	-4449.361*	893.943
2 vs. 5	-4292.344*	902.434
3 vs. 4	-3419.794*	888.963
3 vs. 4	-3262.776*	897.501
4 vs. 5	157.018	899.124

* The mean difference is significant at the 0.05 level.

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