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The relationship between faculty salary outlays and student retention in public four-year universities in the sixteen states of the Southern Regional Education Board

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THE RELATIONSHIP BETWEEN FACULTY SALARY OUTLAYS
AND STUDENT RETENTION IN PUBLIC FOUR-YEAR UNIVERSITIES
IN THE SIXTEEN STATES OF THE SOUTHERN REGIONAL EDUCATION BOARD

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The School of Human Resource Education
and Workforce Development

by

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ABSTRACT

The purpose of the study was to determine if the allocation of faculty salary expenditures has an influence on first-time, full time freshmen retention rates. The population for this study was all public degree granting undergraduate four-year postsecondary institutions accredited by the Southern Region Education Board in the 16 member states with information reported to the U.S Department of Education's Integrated Postsecondary Education Data System database. An inverse relationship exists between first-time, full time student retention and average undergraduate student age. A model exists to predict student retention rates using the regional comparable wage index to suggest this variable can predict first-time, full-time freshmen retention rates in public four-year universities in the Southern United States. Other financial variables related to faculty salaries are salary and fringe benefit outlays, instructional expenses as a percent of total core expenses, and total amount spent on core institutional expenses but did not create a predictive model for student retention rates.

The results of this study found a model exists explaining variance in student retention rates and the non-financial institutional characteristics of total number of undergraduate students, average undergraduate student age, ratio of full time instructional faculty to all employees, percentage of full time male instructional faculty, and percentage of undergraduate male student enrollment combined. As the average undergraduate student age and total number of undergraduate students decreases, student retention rates increase. As the ratio of full time instructional faculty to all employees and percentage of male faculty and undergraduate male students increase, student retention rates increase. As the regional comparable wages increase, the student retention rates increase slightly.

Excluded variables include undergraduate student enrollment by race or ethnicity and full time instructional faculty by ethnicity. However, the review of literature indicates student

and faculty ethnicity plays an important role in student retention rates, therefore, the model should not be used to improve student retention rates in public four-year universities in the southern United States since this data is excluded. Recommendations for further research include using weighted averages to discover an effective model to improve freshman student retention rates.

CHAPTER 1: INTRODUCTION

Early one morning, the chancellor of a four-year public university turned on his computer in his home office to review work emails received overnight. Imagine his surprise when he opened an email from his boss, the president of the university system, which included the recommendation for an unexpected midyear budget reduction. The governor's office had determined the state would not have enough revenue as anticipated at the beginning of the year and overnight ordered state agencies to freeze salaries and hiring immediately and to identify 5% in reductions from state funding. The system president had concluded that the university funds earmarked for a modest 4% faculty salary increase budgeted and scheduled for the beginning of the spring semester would be the perfect reduction to target. The system president's email included a recommendation from the system financial officer citing reduced fall student enrollment and persistent low graduation rates as substantive reasons to cut the earmark. The university chancellor wringed his hands worried the faculty governing body would find a way to oust him if the promised salary increase disappeared. Worse, he feared the student body would suffer from reduced faculty morale and ensuing turnover. If there was a way he could prove the faculty salary increase would actually increase student retention and enrollment, perhaps the funding could be salvaged, and all would not be lost.

Rationale

The following rationale will establish a framework for determining if the allocation of faculty salary expenditures at public four-year universities in the Southern United States has an influence on student retention. This rationale will describe the importance of persistence and retention of first time, full time freshmen, the role of public postsecondary education and its

economic impact, university budgets, the demographics of the Southern United States, and predictors of student retention.

Student Retention

Since 54% of part-time students and 23% of full time students entering four-year post-secondary institutions leave college after their freshman year, retention of these students becomes important (Aud et al., 2011) and retaining students to complete their college education is important to all stakeholders in postsecondary education. Those stakeholders vary in influence power, legitimacy of relationship, and urgency of claim on the institution. Stakeholder categories include clienteles, governing entities, administrators, employees, suppliers, competitors, donors, communities, government regulators, non-government regulators, financial intermediaries, and joint venture partners (Burrows, 1999). Traditional stakeholders of students and governments join local industry as having a significant interest in postsecondary education success (Jongbloed, Enders, & Salerno, 2008).

Student retention financially benefits public postsecondary institutions. The financial relationship between student enrollment and revenue earned through tuition and fees is significant; increased enrollment results in increased revenue (Burton, 2011). Enrollment in public institutions increased from 9.5 million students in fiscal year 2006 to 10.5 million in fiscal year 2009 while tuition and fee revenue increased 24% and operating expenditures rose 20% (Snyder & Dillow, 2010). Revenue from increased student retention also results in increases in the indirect sources of auxiliary departments including bookstore operations, cafeteria, and vending. Retaining students reduces the costs of operations for public post-secondary institutions specifically since retaining existing students is less expensive and more cost efficient than recruiting new students. In addition, student enrollment is a major driving factor in

government funding for public post-secondary institutions with increased student retention resulting in additional funding from these government stakeholders (Burton, 2011). Increased enrollments are positively associated with increased appropriations (Tandberg, 2010). Student retention is a factor in higher education funding formulas that require specific performance outcomes specified by state legislators rewarding those with increases and penalizing those with reduced outcomes (Hearn & Holdsworth, 2002). Student retention at higher education institutions is important to the regional accreditation process (Burton, 2011). Schools reflecting low success in retaining students is viewed unfavorably by accrediting bodies. When evaluating the quality of a post-secondary institution, student retention is in the criteria for accreditation (Southern Association of Colleges and Schools, 2004). To summarize, low student retention rates are a critical factor in post secondary educational institutions (Lotkowski, Robbins, & Noeth, 2004).

Student retention in postsecondary public institutions is important to society and to college students (Burton, 2011). Expenditures in degree granting postsecondary institutions exceeded \$461 billion domestically (Snyder & Dillow, 2011). For society, a higher student retention level results in benefits to individuals and businesses giving taxpayers a better return on their investment (Burton, 2011; Redlinger & Valcik, 2008). College graduates earn more resulting in a higher quality of life. Average earnings of a college graduate are 64.8% higher than those who have a high school diploma and no college. Tax revenues earned by four-year college graduates average \$5,900 higher than high school graduates increasing the positive impact that post-secondary completion brings to individual communities (U.S. Department of Education, 2011). Individuals find that globalization changes require advanced skills and higher technological competence. The number of jobs that require advanced skills grows at twice the

rate of those requiring basic skills (Lotkowski et al., 2004) and the U.S. Department of Education (2011) has projected that trend will continue with 62% of all jobs by 2018 will require some college education with 23% needing a completed four-year college degree. Student persistence to successful graduation has the potential to impact individual and societal prosperity, increasing the economic and social incentive to improve student retention (Braxton, McKinney, & Reynolds, 2006).

Public Postsecondary Education

Enrollment in public postsecondary education institutions continues to increase. The price of attendance is also increased but still lower than private institutions. Recent federal programs designed to improve public higher education accountability, affordability, and access are now available. Public institutions of higher education offering four-year degree programs are key to continued economic growth and success. (U.S. Department of Education, 2011)

College enrollment set new records in 2010 with a projected 20.6 million students enrolled in all postsecondary institutions. A full 76% of all undergraduate students attended public institutions in fall 2009 (Aud et al., 2011). In addition, awarding 1.7 million postsecondary bachelor's degrees is projected or 8.2% of all students attending all colleges, which is 33% higher than 1998-1999 (Snyder & Dillow, 2011). Although private schools also saw increases in degrees awarded, the number of bachelor's degrees awarded by public institutions was 64% of all bachelor's degrees. This includes students who may have stopped out and restarted or those students who transferred from a community or junior college. The majority of bachelor's degrees awarded are from public institutions. (Aud et al., 2011)

Prices at public postsecondary institutions remain significantly lower than private institutions allowing continued access to higher education for those who cannot afford the private school rates. The price of attendance relies heavily on the tuition and fee structure of

institutions. Both private and public institutions have increased tuition and fee rates, however, public universities started at a much lower level. Increases in public school tuitions are offset by increases in need based grants and merit based aid. In fact, the expenditures per student at public postsecondary institutions decreased relative to the private universities with average expenditures at public four-year institutions decreasing from about 78% to 72% of private schools in the 20 year period ending 1995-1996 (Ehrenberg, 2006). Total tuition, room, and board rates for full time undergraduate students is \$15,014 for the year 2009-2010, or 45.8% of the total cost for private institutions (Snyder & Dillow, 2011).

Public four-year institutions are important to the future of the American workforce. With the projection that over half of all new jobs in 2018 will require a postsecondary certificate or degree, the Obama administration has created a competitive grant program for higher education. All states have been given the opportunity to compete, and a set of guidelines provided with benchmarks and goals to be set by September, 2011. The efforts include formalizing plans to increase student retention and degree completion, designing performance based funding, aligning high school standards with college standards, improving credit transfer processes, creating longitudinal data systems to improve decision making, stabilizing tuition costs and reducing operational costs with technology, and targeting adult learners to complete previously started college paths. About half of the states are partners with Complete College America to develop the goals and performance indicators while others have decided to develop their own performance accountability processes. The goal of the entire program is to create a well-educated workforce to compete globally. (U.S. Department of Education, 2011)

To summarize, public four-year postsecondary institutions continue to offer accountability and the most affordable cost of a baccalaureate degree. These institutions of

higher learning offer accessibility to degree programs to millions of Americans who would otherwise be unable to achieve that dream.

University Budgets

Public colleges and universities are required to report financial data according to standards prescribed by the Governmental Accounting Standards Board (GASB) (Goldstein & Menditto, 2005). These accounting principles dictate uniform reporting of revenue and expenditure. In particular, public colleges and universities must classify expenditures by function or core activity. Primary function classifications permitted for higher education and general expenses include instruction, public services, academic support, student services, institutional support, operation and maintenance of plant, scholarships, and services (National Association of College and University Business Officers, 2001). Those classifications are subtotaled on financial reports with additional function classifications of research, public service, and hospitals reported separately, then totaled in the final reports.

Uniform expenditure and revenue classifications are required in reporting to the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS). Research literature indicates that the postsecondary institution's history, priorities, and culture are reflected in the levels budgeted in each of the educational and general functional classifications (Ryan, 2004). Specifically, the amount of funding allotted to the area allows for the opportunities to be expanded or addressed. Conversely, the lack of funding to an area results in less resources and fewer results attained. The largest expense outlay in universities is salaries in the function classification of instruction. The collected and reported data can be used for comparative purposes such as Toutkoushian's (1999) analysis of cost functions in policymaking and institutional research. Fiscal policy framework, although influenced by politics, state economic

and demographic factors, and postsecondary education attributes can also be influenced by the data reported (Tandberg, 2010).

Four-year Universities in the South

Academic studies commonly focus on defined geographic regions (Burton, 2011; Schmitz, 1993). Rowntree, Lewis, Price, and Wyckoff (2006) define a region as a particular area with proximity and economic and social integration. This study focuses on public four-year colleges and universities in the Southern United States.

This study defines the Southern United States region as those states participating as members of the Southern Regional Education Board (SREB) (Burton, 2011). The 16 states listed as members are Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia (Southern Regional Education Board, 2010) containing about one-third of the United States population (Burton, 2011). The SREB is a non-profit organization based in the south, as opposed to Washington, D.C., that works on initiatives to improve education from Pre-K programs to higher education. One of their premier initiatives is the SREB-State Data Exchange which the SREB describes as “a one-of-a-kind regional program with 23 statewide higher education governing and coordinating board partners.” They indicate that policy makers frequently use the SREB data. The comparison data categories include enrollment indicators, student persistence, graduation, and progression indicators, student price and financial aid indicators, college funding indicators, and faculty compensation indicators. (Southern Regional Education Board, 2010)

The demographic challenges for the 16 states in the SREB include issues related to high school and college completion, median income, and minority and poverty ratios (Burton, 2011).

When compared to the nation, graduation rates for students at four-year post-secondary institutions in SREB states are lower than national rates. High school students in the region are less likely to graduate at all or on time directly impacting the number of students able to attend college (Collins, 2010). SREB state populations are growing and expected to contain 39 percent of U.S. population by 2028 (Marks & Diaz, 2009). The racial and ethnic minorities in SREB states will comprise the largest portion of the SREB population growth. These minorities have historically lower high school and college persistence completion rates (Collins, 2010). Students in SREB states are more likely to receive free or reduced lunches in high school reflecting the poverty levels in the region. Median household income in the SREB region is declining while tuition and fee levels are increasing resulting in fewer financial resources available for college expenses (Marks & Diaz, 2009). The challenges are important when studying student retention rates and institutional operating costs in the Southern United States.

The other prominent governing body for post-secondary institutions in the Southern United States is the main accreditation organization known as the Commission on Colleges of the Southern Association of Colleges and Schools, or “SACS” (Southern Association of Colleges and Schools, 2009). This body reviews programmatic quality for all institutions of higher education for the following 11 states: Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia. Ongoing quality enhancement programs are used with reporting to maintain accreditation. The U.S. Department of Education requires accreditation by this organization in order for the schools to receive federal funding for students such as Pell Grants and Stafford Student Loans. In addition, SACS requires evidence of sufficient financial resources as part of the accreditation and reaffirmation process (SACS, 2009). The existence of the SREB and SACS solely to assist and evaluate post-

secondary educational institutions in the Southern United States indicates this region is worthy of a focused academic study (Burton, 2011).

Freshmen Retention Prediction Models

Student retention is the subject of several notable, published academic studies beginning with the most prominent researcher studies by Spady (1971), Tinto (1975, 1982, 1987, 2006), Pascarella (1979), Bean (1980, 1990), and Astin (1984, 1993). A few examples of retention techniques reported to be successful include support programs for new students, high school academic preparation programs, course completion and grade point average tracking mechanisms, first-year experience programs, faculty and peer interaction especially among high-risk students, orientation courses, and learning communities (Moore & Shulock, 2009). Although successful retention techniques are many and varied, research in post-secondary student retention indicates no model is the best for all institutional approaches (Braxton, Hirschy, & McClendon, 2004).

Student retention predictive models for freshmen retention identify academic and social systems (Tinto, 1975), institutional and student environment factors (Bean, 1980), and student effort and interaction (Pascarella & Terenzini, 1991) as significant risk factors in student retention. Many predictive models center on the common risk factors of academic elements, institutional elements, life issues, personal elements, and social elements. The common academic risk elements identified are students who are underprepared, have poor academic skills and poor student habits, inability to identify course value, lack of career and educational goals, and little or late feedback. Institutional risk elements include course scheduling issues, poor teaching and advising, and institutional bureaucratic issues. Life risk issues include finances, employment, family and health. Personal risk elements include closed mind, lack of discipline and motivation or realistic expectations, stress, and insecurity. Common social risk elements

include peer pressure, lack of involvement with faculty or activities, and social alienation (Burton, 2011; Ness, 2004). Important to note is that none of these freshmen retention models include internal allocation of institutional finances as a risk factor for college retention (Burton, 2011).

Need for the Study

Factors that influence faculty pay at American universities are a well-researched topic. Research has focused largely on experience factors, gender factors, and tenure track factors (Knapp, Kelly-Reid, & Ginder, 2010; Snyder & Dillow, 2011). Since faculty pay research began in the 1960's, top theorists have advocated various conceptual theories. These theories range from sounding the alarm to close the gap on gender equity in higher education (Bradburn & Sikora, 2002) to the rationale for the current reduction in the number of tenure or tenure-track positions as an effect of increased part-time faculty (Umbrach & Wawrzynski, 2005). Theoretical approaches reflect many influences on faculty pay scales such as tenure, rank, gender, ethnicity, type of institution, experience, and age (Bradburn & Sikora, 2002; Knapp et al., 2010). Analyzing any potential relationship between faculty salary expenditures and student retention rate would be beneficial to legislators and higher education administrators making funding decisions with limited resources. Few studies focus on institutional faculty salary outlay and the impact on student retention (Ryan, 2004).

In the southern state of Louisiana, the Board of Regents approved a post-secondary funding formula that included the factor of student retention (Simoneaux, 2010). In effect, higher student retention rates result in higher public funding and, conversely, lower student retention rates directly result in lower legislative funding recommendations. A need exists to determine if the differences in faculty pay and benefits at the four-year Southern Regional Education Board (SREB) public post-secondary baccalaureate institutions correlate to student

retention rates. The existence of an association between faculty salary, benefits, and student retention may suggest that changes in salary and benefit outlays impact student retention.

Purposes and Objectives

The purpose of this study is to determine if a model exists that allocates faculty salary outlays in a manner that increases freshman retention in public four-year post-secondary institutions in the 16 states of the Southern Region Education Board (SREB). The objectives of this study are as follows:

1. Describe the following financial characteristics as related to faculty salaries for public four-year SREB universities:
 - Average salary outlays of full-time instructional faculty
 - Average fringe benefits outlays of full-time instructional faculty
 - Instructional expenses as a percent of total core expenses
 - Proportion of university expenses paid by financial aid
 - Total amount spent on core institutional expenditures
 - Comparable wage index
2. Describe the following selected non-financial characteristics of public four-year SREB universities:
 - Student retention rates of first-time bachelor's or equivalent degree-seeking undergraduate full-time students, fall-to-fall
 - The total number of undergraduate students enrolled in the institution
 - The number of full-time equivalent undergraduate students
 - The percentage of total undergraduate student enrollment in each of the following ethnic groups: White non-Hispanic, Black non-Hispanic, Hispanic, Asian or Pacific Islander, and American Indian or Alaska Native

- The percentage of total student enrollment by gender
 - The average undergraduate student age at institution
 - The percentage of full-time instructional faculty
 - The percentage of full-time instructional faculty by gender
 - The percentage of full-time instructional faculty in each of the following ethnic groups: White non-Hispanic, Black non-Hispanic, Hispanic, Asian or Pacific Islander, and American Indian or Alaska Native
 - The percentage of full-time instructional faculty by academic rank as follows: Professor, Associate professor, Assistant professor, Instructor, and Lecturer
 - The percentage of full-time instructional faculty by tenure status as follows: Tenured, Tenure-track, and Non-tenured
 - The percentage of full-time instructional faculty by contract length as follows: 9/10 month contract or 11/12 month contract
3. Determine if a relationship exists between student retention rates and the financial and non-financial characteristics of SREB universities.
 4. Determine if the financial characteristics of SREB universities explain a practically important proportion of the variance in student retention rates.
 5. Determine if the financial characteristics of SREB universities explain a practically important proportion of the variance in student retention rates, after controlling for the non-financial characteristics of the institution.

Significance of the Study

Stakeholders in public four-year universities in the Southern United States could benefit if a correlation exists that would successfully optimize the allocation of faculty salary

expenditures as a percent of overall institutional expenditures in order to increase freshman retention. If the study reveals faculty pay and benefits at the four-year Southern Regional Education Board (SREB) public post-secondary baccalaureate institutions correlate to student retention rates, then the existence of an association between faculty salary, benefits, and student retention may suggest institutional changes in salary and benefit outlays to impact student retention. The findings of the study could aid decision-makers by providing information for strategic planning purposes. If a correlation exists, then administrators and legislators could fund public four-year universities to maximize revenues to increase first-year freshmen student retention thereby increasing college completion rates overall.

Definitions of Terms

The following terms and definitions are used in this study. A reference is provided for any term that has been taken from the literature. If a term does not have a reference, the definition is quoted directly from the Integrated Postsecondary Education Data Systems' Institute of Education Sciences' Glossary (2011).

- **Attrition:** “Refers to the process of students dropping out of college, usually during the first or second year, and failing to reenroll at an institution in subsequent terms” (Burton, 2011, p. 12).
- **First-time student:** “A student who has no prior postsecondary experience (except as noted below) attending any institution for the first time at the undergraduate level. This includes students enrolled in academic or occupational programs. It also includes students enrolled in the fall term who attended college for the first time in the prior summer term, and students who entered with advanced standing (college credits earned before graduation from high school).”

- **First-year student:** “A student who has completed less than the equivalent of one full year of undergraduate work; that is, less than 30 semester hours (in a 120-hour degree program) or less than 900 contact hours.”
- **Fringe benefits:** “Cash contributions in the form of supplementary or deferred compensation other than salary. Excludes the employee’s contribution. Employee fringe benefits include retirement plans, social security taxes, medical/dental plans, guaranteed disability income protection plans, tuition plans, housing plans, unemployment compensation plans, group life insurance plans, worker’s compensation plans, and other benefits in-kind with cash options.”
- **Full time equivalent students:** “The number of all students attending an institution part-time and full-time divided by the institution’s hours required for full-time status. May include high school students in dual enrollment programs.”
- **Full time instructional faculty:** “Those members of the instruction/research staff who are employed full time and whose major regular assignment is instruction, including those with released time for research. Also, includes full-time faculty for whom it is not possible to differentiate between teaching, research and public service because each of these functions is an integral component of his/her regular assignment.”
- **Persistence:** “Student’s decision to reenroll at institution for fall” (Braxton, Jones, Hirschy, & Hartley, 2008, p. 77).
- **Retention:** “The rate at which students persist and graduate” (Tinto, 2006, p. 2).
- **Tenure:** “Status of a personnel position with respect to permanence of the position.” (IPEDS’ IES’ Glossary, 2011)

CHAPTER 2: REVIEW OF LITERATURE

Characteristics of Postsecondary Education

Postsecondary education includes post high school educational experiences that encompass academic, career and technical, and continuing professional education offered by private and public American colleges and universities and includes certificate and degree programs. Degree-granting institutions are postsecondary institutions granting associates or higher academic degrees and have met requirements for their students to participate in federal funded financial aid programs administered by the Department of Education (Snyder & Dillow, 2011). Characteristics of postsecondary institutions include whether or not an institution is profit or non-profit, publicly or privately controlled, and level of degrees awarded. Different learning environments further define the postsecondary institutions such as research universities, admission selectivity, and religious affiliation (Aud et al., 2011). Postsecondary education is often described in different categories such as college enrollment, faculty, degrees, and prices (Snyder & Dillow, 2011) or by student characteristics, programs and courses, faculty and staff, and finance (Aud et al., 2011). The contexts of postsecondary education include non-financial characteristics of role, enrollment, gender and ethnicity of students and faculty, attendance status and age, fields of study, level of study, graduation rates, retention rates, and faculty and staff composition. The contexts also include financial characteristics such as the proportion of university expenses paid by financial aid, revenues and expenditures per student, salary and benefit compensation packages (Aud et al., 2011; Cataldi, Bradburn, & Fahimi, 2005; Schmitz, 1993), and geographic region and cost of living (Toutkoushian, 1999). Data is collected on the most important defining characteristics such as enrollment indicators, student persistence and graduation indicators, student price and financial aid and funding indicators, and faculty

indicators. Enrollment indicators include full time equivalent, also called FTE, enrollment, undergraduate credit and/or contact hours taken by high school students, and undergraduate instruction through distance learning methods. Student persistence indicators include first year student persistence rates, graduation and progression rates, degrees and awards conferred, graduating students who transferred, and the number of years to complete a degree. Student price and financial aid indicators include examination of annual tuition and required fees, funding for student financial aid, and operating revenue per FTE student (SREB, 2010). Faculty indicators can include compensation in the form of salaries and additional benefits, employment status, age, gender, ethnicity, tenure status, and teaching field (Cataldi et al., 2005; SREB, 2010).

College Enrollment

College enrollment indicators include student composition characteristics, student financial aid, and instructional expenses. Snyder and Dillow's (2011) analysis indicates enrollment can be examined by the number of students attending an institution and whether or not they are full time students or part time students, as well as gender, age, ethnicity and disability status of the students, and the ratio of these characteristics to total enrollment (p. 281-282). Recent enrollment trends in postsecondary degree granting institutions indicate public institutions have experienced the greatest enrollment increase experiencing a 38% increase between 1999 and 2009, with students going full-time increasing 45% and students attending part time increasing 29%. An analysis of enrollment by age indicates the number of students age 25 and above has increased 43% in about the same time period, 2000-2009, with enrollment of students under age 25 increasing by 27%. An analysis of undergraduates reporting a status of disability has not changed significantly from 2003-2004 to 2007-2008. Ethnicity of student enrollment characteristics in postsecondary undergraduate education is reported as white enrollment decreasing 6% between 2000 and 2009 while students who identify their ethnicity as

Hispanic, Asian or Pacific Islander, American Indian or Alaska native, and black have increased from 30% to 36%, or about a 6% increase, during the same time period (Snyder & Dillow, 2011).

The college enrollment indicators of student financial aid include student employment, grants, and loans. The report by Aud et al., (2011) adjusts 2007-2008 data by the Consumer Prices Index for all Urban Consumers (CPI-U) referring to the adjustments as “constant 2009-10 dollars.” From 1999-2000 to 2007-2008 the number of full time, full year undergraduates receiving grants from any source went from 59% to 65%, or an increase of about 6%. From 1999-2000 to 2007-2008 the number of full time, full year undergraduates who received a loan went from 45% to 53%, or an increase of about 8%. The number of employed full time college students between the ages of 16 and 24 decreased from 47% in 2001 to 41% in 2009 (Aud et al., 2011), a decline of 6%. College student employment of full time students at public four-year institutions fluctuated during the same time period but did not change by a full percentage point (Aud et al., 2011). About 80% of all full time undergraduate college students received some form of financial aid in 2007-2008 (Snyder & Dillow, 2011).

Instructional expenses as an indicator in college enrollment indicate undergraduate tuition, room, and board annual prices at public institutions rose 37% between 1999-2000 and 2009-2010. In 2008-2009, the total institutional expenditures per full time equivalent student were \$27,135 at public degree-granting colleges and \$36,707 at public four-year colleges representing a 6% increase after adjustment for inflation of 2003-2004 average expenditures per FTE. Endowment funds, another source of operating funds for postsecondary institutions, reported a market value decrease of 20% between 2008 and 2009 (Snyder & Dillow, 2011).

College Degrees

The number of degrees awarded has increased with the number of students enrolled in postsecondary degree granting institutions. Awarding of bachelor's degrees experienced an increase rising 33% between 1998-1999 and 2008-2009 (Aud et al., 2011) with the number of males at 32% and females at 34% (Snyder & Dillow, 2011). Private for-profit institutions increased at all degree levels percentage-wise higher than public and private not-for-profit institutions, however, the private for-profit institutions only awarded 5% of all bachelor's degrees awarded in 2008-2009 with private not-for-profit postsecondary institutions reported at 31% and public institutions awarding the most at 64%. The percentage increase for the same time period for other degrees awarded varied with master's degrees increasing 49%, first-professional degrees by 17%, and doctor's degrees by 54%, with an additional 806,000 certificates awarded. Bachelor's degrees awarded by teaching field varied from the overall 33% increase with engineering and engineering technologies increasing by 16%, health professions by 50%, biological sciences by 26%, physical sciences by 23%, with technical fields and other fields reported as unstable. The graduation rate for first time full time freshmen who began in 2002, attended a four-year institution, and completed a bachelor's degree or the institution's equivalent within six years is reported at 57% using the following calculation process:

$$\text{Graduation Rate} = \frac{\text{Total number of completers within 6 years}}{\text{Cohort of students First Time Full Time Freshmen in 2002-03}}$$

The graduation rates also reflected variations by ethnicity with students identifying themselves as Asians and Pacific Islanders exceeding the average at 67% and whites at 60% with Hispanics below the average at 59%, blacks at 40%, and American Indians and Alaska Natives reported at 38% (Aud et al., 2011).

The research literature indicates about one fifth to one quarter of all first year students fail to return to the beginning institution the second year and half of all student failing to graduate in the expected 6-year period (Ryan, 2004). A study by Smart, Ethington, Riggs and Thompson (2002) found a complicated small relationship between institutional expenditures and student leadership growth factors. Factors such as enrollment levels, institution location, university mission, and faculty characteristics can also influence institutional expenditures (Toutkoushian, 1999). The literature searched includes faculty salary comparisons in institutional expenditures but has not been researched regarding connections to student retention and graduation rates.

College Faculty

Postsecondary institutions that awarded associate or higher degrees and eligible for federal financial aid programs employed over 1.7 million faculty members in fall, 2009. This number includes 761,035 part-time faculty and 300,000 graduate assistants and accounts for about 48% of all staff, professional, and non-professional, full-time and part-time (Snyder & Dillow, 2011). Knapp et al. (2010) report 46% actually had faculty status with 30% tenured or tenure track, 10% not on tenure track, 7% employed without a tenure track system in place. Faculty gender composition is reported at about 53% male and 47% female, with full-time faculty about 51% of all faculty. The ratios in public degree-granting institutions differ from the numbers reported for all institutions and account for about 46% of all faculty reported (Snyder & Dillow, 2011). The total number of faculty and graduate assistants comprised about 45% of all employees combined, a gender ratio of 56% male and 44% female with full-time faculty indicated at a much higher ratio of about 68% (Snyder & Dillow, 2011). When tenure is added to the analysis of degree-granting institutions, the ratios change to 65% of full-time faculty with

tenure reported to be men, and 35% were women. In addition, 81% were white, 8% reporting as Asian, Native Hawaiian or Pacific Islander, 5% black, and 4% Hispanic (Knapp et al., 2010).

Another postsecondary characteristic involves the ratio of full-time-equivalent (FTE) students to total FTE staff and to FTE faculty, which increased in all categories from 1999 to 2009. Total staff, all institutions, went from 4.8 to 5.4 FTE students per FTE staff member with public institutions increasing from 5.2 to 5.8 and private institutions increasing from 4.0 to 4.7. The ratio of FTE students to FTE faculty for all institutions increased from 14.9 to 16.0, with public institutions increasing over private from 15.8 to 17.3 and private institutions increasing from 12.8 to 13.7 (Knapp et al., 2010).

Research Addressing Dependent Variable (Student Retention)

The primary variable of interest in this study is fall-to-fall retention rate for first-time first-year students. Many studies are available that examine student retention in postsecondary institutions recognizing the importance of the factor of student retention to the ultimate goal of student graduation. Few studies compare student retention to institutional expenditures. A study by Smart et al. (2002) supported Astin's (1993) findings that expenses related to student services had a positive effect on student involvement, while Ryan (2004) found that increased student services expenditures did not improve degree attainment but increased instructional and academic support expenses had a positive effect on graduation rates of the cohort studied.

Many recent studies have found student involvement as a significant variable on student retention. Vincent Tinto (1982, 2007), a distinguished professor at Syracuse University, began his studies building models unlike previous psychological models and exploring the environmental aspects of the student experience to change our understanding of student retention. He focused on a longitudinal model to explain how the social and academic environment impacted the student experience and ultimately the student's persistence in

continuing until degree attainment. Tinto's study (1982) does not use financial factors but begins with studying why students leave which he calls "dropout behaviors." He develops a model of dropout to explain many differing causes leading to voluntary withdrawal in postsecondary institutions. The model focused on the characteristics of entering students including attributes, value orientations, commitments, skills, and entering abilities but did not focus on interaction with the institution. If a student was unsuccessful, the focus was on the student's inability to perform and not the institution's. Tinto notes that a serious shortcoming is that his model does not adequately emphasize the student's issues with finances as it relates to persistence decisions. Addressing financial factors focusing on the student's financial need as it relates to cost and benefits of higher education persistence is important. It also does not focus on transfers to other institutions leading to permanent withdrawal, and does not take into account the effect of gender, race, or socioeconomic factors. Student retention models are limited to either accounting for variation in behaviors or explaining origins of behaviors leading to withdrawal or dropout (Tinto, 1982).

Other factors leading to dropout can be institutional attributes and their effect upon student behaviors. The problem of dropout rates has been one of the most stable and predictable rates in postsecondary education in the United States with the exception of the time period around World War II and the beginning of the G.I. Bill where they remain nearly constant at 45%. Higher education began in America as colonists began by imitating British institutions of higher education. The postsecondary education system spread out across the land as the country expanded taking on the characteristics of the needs and attributes of each particular geographic region. As elementary and secondary systems began centrally and expanded to the individual states, higher education did not experience a centralized system. The policies guiding higher

education were regionalized and funding policies at the federal level influenced institutional and individual decision making. When World War I ended, the G.I. Bill of 1944 allowed veterans to attend school at the postsecondary level and the number of institutions springing to answer that need expanded. The Higher Education Act of 1965 and the Basic Educational Opportunity Grant (BEOG) of 1972, also known as the Pell Grant, began to address financial needs of lower socio-economic students to make higher education more affordable. The Clinton-era tax policies in 1997 of the Hope and Lifetime Learning Credit targeted the middle class and intended to encourage access to college degree attainment. None of these federal financial policies address the academic requirements for a postsecondary education much less a student's ability to adequately assess higher education preparation requirements for degree attainment (Strach, 2009).

Research on student involvement stresses the need to structure the student's intellectual and social integration to improve student involvement thereby increasing the likelihood of persistence and degree attainment. Tinto argues (1982) that institutions need to choose between program quality and broadening appeal. Increasing higher education appeal may cause better prepared students to withdraw from the perception of reduced worth where increasing program quality may limit the number of students with access to higher education but improve outcomes. Tinto's earlier work indicates the first year of college has the highest dropout rate and consequently more activities should focus on reducing the social trauma involved in changing from a high school environment to a college one. Institutions should ensure retention programs are longitudinal, included in the admission process, and involve multiple functions of the college.

Tinto's recent research (2007) differentiates between student retention and student persistence. The two concepts are mutually exclusive since knowing why a student stays does

not give us the information on why a student leaves. To complicate the situation, the variables that influence student persistence, such as high school experiences and family background, are not useful to policy makers since they cannot control or change those variables. Important new information indicates classroom practices directly impacts student learning and persistence. The research shows learning communities influencing and enhancing student retention and that faculty actions and interactions are essential to the student experience. Tinto (2007) states:

So too have we yet to test the efficacy of institutional practices that differentially allocate faculty and resources to different segments of the institution. In this regard it is striking that many institutions, in particular the larger state colleges and universities, continue to assign the least experienced, typically least well paid, faculty to the key first year courses. The use of adjuncts and junior faculty for these typically large classes continues even though research tells us that the first year is the critical year in which decisions to stay or leave are most often made, where the foundations for effective learning are or are not established and where, by extension, the potential returns to institutional investment in student retention and learning are likely to be greatest. (p. 8)

Faculty reward systems do not align with student outcomes at the postsecondary level, however, institutional faculty and staff pay policies can be designed to promote behavior that would enhance student persistence, retention, and degree completion. Institutional policies currently reward faculty research and publishing which are not tied to student education or student retention. However, empirical evidence does not support that student retention programs with increased resources result in increased benefits to the institution. Access to higher education has significantly increased, but degree attainment has not significantly changed (Tinto, 2007).

Radford, Berkner, Wheelless and Shepherd (2010), compared attainment and persistence over a six year period from 2004 to 2009. At any postsecondary institution, among the 2003-2004 beginning students, about 31% had received a bachelor's degree from any institution. When broken down by type of first institution, the private non-profit four-year institutions had a graduation rate of almost 65% and public institutions had almost 60% degree attainment.

Among the 2003-2004 beginning students, 22% had received a bachelor's degree within six years from the first institution they attended, 6% were still enrolled at their first institution, while 27% transferred to another institution, and 28% had dropped out and not returned within the six years studied. Among the students who began in 2003-2004 and first enrolled in a four-year postsecondary institution, almost 54% had attained a degree with 50% receiving a bachelor's degree, 3% attaining an associate's degree, and 1% receiving a certificate of completion within the six years reviewed. Significantly, of the 46% who had not received a degree by spring, 2009, 25% had transferred to another institution, 17% had dropped out completely, and 5% were currently enrolled (Radford et al., 2010).

Lotkowski et al. (2004) reported ethnicity as a factor that impacts student retention. Those students identifying themselves as African Americans or Hispanic have a lower completion rate than those students identifying themselves as Caucasian. Their study indicated the non-academic factors influencing student retention as academic goals, achievement motivation, academic self-confidence, academic-related skills, contextual influences, general self-concept, student's commitment to the institution, social support, and social involvement. Additional factors included socioeconomic status, and the academic factors of high school grade point average and ACT assessment scores. The factors with the strongest numerical value were the academic-related skills, academic self-confidence, and academic goals factors. The factors with the least numeric value were achievement motivation and general self-concept. They highlighted student retention strategies aimed at improving graduation rates all of which center on the student and do not address institutional finances or faculty (Lotkowski et al., 2004).

The few studies that have examined institutional expenditure patterns in relationship to student success do not find a strong relationship between student outcomes and institutional

expenditures. Instructional expenditures are the largest amount of institutional expenditures and instructional faculty salaries are the largest amount of instructional expenditures, which leads to the independent variables in this study.

Research Addressing Potential Explanatory or Independent Variables (Faculty Salaries)

Several variables were found in the research literature to address the potential explanatory variables of faculty salary outlays. Knapp et al. (2010) report their analysis of fall, 2009, Integrated Postsecondary Education Data System (IPEDS) data collection by rank, contract length, gender, and adjust for inflation. Their review for all institutions compared to public four-year Title IV degree-granting institutions is below:

Table 1. Full Time Instructional Staff at Title IV Degree-granting Institutions Academic Year 2009-2010

Institution type	Professor	Associate professor	Assistant professor	Instructor	Lecturer	No rank
Total	26%	22%	23%	16%	5%	8%
Public	25%	21%	22%	17%	5%	9%
Public 4 year	30%	26%	27%	8%	7%	3%
men	38%	26%	23%	5%	5%	2%
women	19%	25%	31%	11%	9%	3%

Note. Table adapted from Knapp, Kelly-Reid & Ginder, 2010.

The reported findings indicate the public four-year ratios compare similarly to the overall number of instructional staff at all Title IV degree-granting institutions. However, in public four-year colleges, the differences in the distribution of faculty by rank and gender change significantly with male professors double the number of female professors and the 20% ratio of female instructors and lecturers is double the male instructors and lecturers ratio of 10%. The fall, 2009, salaries of faculty reviewed on nine-month averages indicated professors earning, on average, \$103,000, which is almost double instructors' pay at \$53,000. Associate professors are reported averaging \$74,000 or 40% more than the next rank of assistant professors at \$62,000 and lecturers and no academic rank on par with instructors at \$54,000 and \$55,000 respectively.

Male professors earned an average \$108,104, which is 13% more than female professors at \$95,942 earn. Both increased in constant 2009-2010 dollars from 2003-2004 with men increasing 4.4% and females increasing 3.2% (Knapp et al., 2010).

Snyder and Dillow (2011) report common post-secondary data elements include faculty salaries and contract length, full time staff ratios, faculty ethnicity, faculty tenure status by gender and control of institution, revenue per FTE student by source of funds, as well as student enrollment, retention, and graduation rates.

Bradburn and Sikora (2002) examine the relationships of gender and ethnicity to type of institution, faculty outcomes, and the faculty characteristics of salary, rank, tenure, academic field, education, workload, academic experience, level of education, and research outcomes. Specifically they focus on instructional staff reported, excluding teaching assistants, in the fall of 1998, which were full time and had for-credit instructional duties, using a regression analysis showing the relationships of gender and ethnicity to salary after controlling for the remaining faculty characteristics. Findings from their multiple regression analysis indicated the faculty characteristics of tenure, rank, education, and experience are related to salaries in addition to gender and ethnicity, but there were no statistically significant differences in the average salary of faculty after controlling for these factors. The gender and ethnicity differences were significant after adjusting for the additional faculty characteristics. In addition, they found salaries also associated with type of institution, academic field, instructional duties, and research activity. After adjusting for the other variables in the analysis, they found that faculty teaching at public and private not-for-profit doctoral institutions were paid significantly more than faculty at public two year institutions. Conversely, faculty who taught at private liberal arts colleges earned less than faculty at public two-year institutions. In addition, the faculty who taught in the

academic fields of business, health sciences, communications, and law more than their counterparts in the engineering and natural sciences who earned more than faculty in the humanities. Publication productivity was found to be a factor indicating those faculty producing more than 10 publications or works over a finite two-year period earned more than those faculty who produced less than 10 publications or creative works in the same time frame (Bradburn & Sikora, 2002).

Most approaches in faculty gender equity use a form of regression analysis to determine gender bias in faculty pay scales. A study by Boudreau et al., 1997, controlled for the predictor variable of faculty rank and found gender bias research in faculty pay results can be misconstrued if faculty rank is not included in the analysis. Variables affecting faculty salary can include years at the institution, experience or years since receipt of highest degree, years in current academic rank, productivity, age, and highest degree attained with an emphasis on terminal degree attainment. Inclusion of faculty rank as a predictor of salary is consistent with faculty salary models. Importantly, market employment conditions can influence initial rank at hire with most full time faculty hired at assistant level positions unless demand significantly exceeds supply. Excluding rank because of indiscriminate promotion practices at the institutional level does not remove the gender bias. Fogel's (1986) argument to include faculty rank as a predictor of faculty salary and the effect on gender equity results from his findings that discrimination in pay is limited within job level. Comparing the salaries of full professors to assistant professors is similar to comparing supervisors to non-supervisors in relationship to gender bias (Boudreau et al., 1997).

Salary compression is another variable that when examined may explain differences in faculty pay. Early comparisons of salaries between junior level faculty and senior faculty do not

review the other characteristics involved in wages but rely on comparisons of mean salaries. Toutkoushian (1998) introduces a logarithm and a five step procedure to measure for faculty salary compression to determine if differences impact the ratio of mean salaries. The first step begins with choosing the independent variables, with the second step separating junior faculty members from senior faculty members or rank with the junior faculty category to include assistant professors with less than three years of experience at the institution. The third step separates the senior faculty and applies a coefficient to the logarithm to determine if senior faculty are compensated in the same manner as junior faculty. The fourth step then substitutes junior faculty member characteristics into the model derived in the previous step to determine their predicted salaries with the difference between the actual salary and predicted salary indicating how much a junior faculty member is being overpaid in logarithms relative to a senior faculty member. In the fifth step the mean prediction residual for junior faculty is calculated utilizing the senior faculty logarithm coefficients resulting in a predicted salary ratio which can be used to compared to the unexplained salary ratio to see if a difference exists. The model uses multiple regression analysis and hypotheses tests of a population mean to provide the model to determine if a difference in average salaries exists and, if so, how large the difference is (Toutkoushian, 1998).

The person who is the most critical in researching the connection between institutional expenditures, higher education finance, and student retention and graduation rates is John F. Ryan (2004). Ryan's research combines the retention, attrition and persistence theories of Tinto, (1975, 1993), Spady (1971), Bean (1980), Pascarella and Terenzini (1991), and Astin (1993) with his own research. He then combines retention research with the production function research synthesis of Hanushek (1997), education expenditure research of Card and Krueger

(1996), and production function approach of Monk (1992) to analyze the effects of post-secondary educational expenditures on student and graduation rates. Empirical studies in post-secondary education combining expenditure variables with graduation rates or retention rates is not as plentiful as the same research combining finances with student outcomes in elementary and secondary education studies (Pike, Smart, Kuh, & Hayek, 2006).

Student Retention and Institutional Expenses

A review of literature exploring the relationships between student retention and institutional expenses, which include faculty salaries, indicates varied approaches. Toutkoushian (1999) used IPEDS data in a multiple regression analysis to estimate alternative cost functions using total expenditures and expenditures per student as dependent variables and controlling for the following variables: graduate and undergraduate enrollment, research dollars received, geographic location, the ratio of students to faculty, average professor salary, percentage of faculty by rank, percentage of expenditures for instruction, and control by public or private entity. His research found that expenditures at public institutions were significantly lower than private institutions. His findings indicated reductions in expenditures per student occur when student enrollment increases. Specifically, if the student to faculty ratio increases by one either by increasing the number of students enrolled or by decreasing the number of faculty employed resulting in reducing expenditures per student by about \$170. His study found that an additional \$100 in average faculty compensation increased the per student cost by \$20. While finding that institutions that had a higher proportion of instructional expenditures also had lower proportion of student expenditures, he indicated policy-makers who seek to decrease expenditures in instruction to reduce expenditures per student would sacrifice quality of student learning due to increased class sizes. Changes in faculty composition, workload, and reducing expenditures in non-instructional categories in the budget would result in cost savings. He warned that

policymakers should consider the value added from the contribution of faculty research to society not present in the for profit world principle of cost minimization (Toutkoushian, 1999).

Findings by Smart et al. (2002) investigated whether higher instructional expenditures at some research universities resulted in higher faculty research expertise while higher instructional expenditures resulted in higher faculty teaching expertise. Their study found that for research and doctoral-granting universities, this variable did not change their initial finding that student leadership competencies were more likely to improve when student service expenditures increased. They concluded that expenditures in student services are a more significant factor than expenditures in the cost function of instruction as supported by Astin (1993). Conversely, Ryan's (2004) findings regarding degree attainment and institutional expenditures suggest expenses in instruction and academic support functions resulted in a positive effect but that expenditures in student services did not.

Deficiencies/Limitations in Literature

There appears to be a significant gap in both the research conducted and the scholarly articles published in the area of correlating faculty salary expenditures as a percentage of total institutional expenditures and the effect on student retention. Limited research is conflicting in whether student expenditures are more beneficial than institutional expenditures. Some research concentrates on salary compression factors and predictive models to adjust cost of living pay adjustments while other research provides models to remedy gender inequity at the institutional level. Examining the relationship of student retention to instructional institutional expenditures while controlling for institutional variables and faculty salary variables as they relate to the institution do not appear to have been studied.

Theoretical Framework for the Study

This study follows the theoretical framework utilized by John F. Ryan (2004) on expenditures by institutional cost function and student retention. Ryan's research combines the retention, attrition and persistence theories of Tinto, (1975, 1993), Spady (1971), Bean (1980), Pascarella and Terenzini (1991), and Astin (1993) with his own research. These theories focus on post-matriculation factors that may affect student retention (Burton, 2011). Astin's focus is student involvement, Bean's focus on student satisfaction, Tinto's focus is student engagement, and Pascarella's focus is faculty and student interaction. Ryan chose to combine each theory to create an institutional cost function theory.

Table 2. Theories Used by Ryan as Components of the Institutional Cost Function Theory

Institutional cost function	Retention theories
Instructional expenditures	Tinto (1993), Pascarella (1980), Astin (1993), Bean (1980)
Academic support	Tinto (1993), Bean (1980)
Student services expenditures	Astin (1993), Bean (1980)

Ryan's (2004) research indicates expenditures in certain cost functions impact cohort graduation rates. Funding in the cost function of instruction and academic support produced a positive and significant effect on cohort graduation rates. Conversely, funding in the cost function of student services did not appear to have a positive or a significant effect. Funding in the cost function of institutional support had an insignificant effect on student retention and degree attainment. He suggests that expenditures in cost functions that do not support student retention directly impacts student retention expenditures since those funds are no longer available to support student retention. Ryan proposed the following conceptual framework for expenditures in student persistence models.

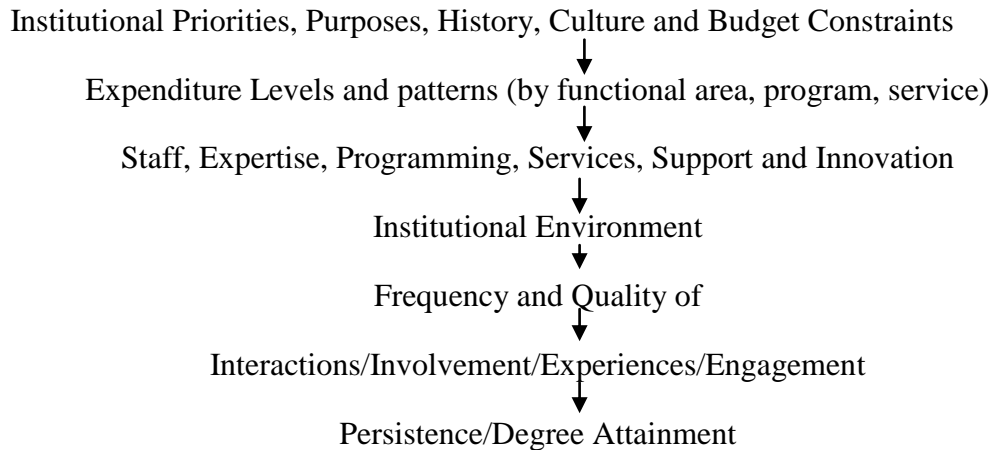


Figure 1. Ryan's (2004) Conceptual framework for expenditure component in persistence models

He contends that the funding committed to various cost functions is reflective of the institution's priorities, budgetary limitations, culture, history, and institutional purpose. The funding allocated to various cost functions directly impacts the type of faculty and services supported by the institution and the shape of the entire institutional environment. The institutional environment then directly influences the student experience including the faculty, staff, and students that bears directly on student persistence (Ryan, 2004). For example, more funds expended in the cost function of instruction, including faculty pay and related benefits, inherently causes less funding in student services, academic support services, and/or institutional expenses. Reduced funding in non-instructional cost functions can reduce funds available for student retention efforts, excluding instructional expenses. Additional study is needed to determine if a correlation exists between the cost function of faculty pay as part of instructional expenditures and student retention. This study proposes to extend the range of student persistence research by investigating the impact of faculty pay expenditures on student retention.

CHAPTER 3: METHOD

Population and Sample

The target population for this study is all public degree granting undergraduate four-year postsecondary institutions. The cluster sample for this study consisted of the institutions accredited by the Southern Region Education Board (SREB) in the 16 member states with information reported to the U.S Department of Education's (DOE) Integrated Postsecondary Education Data System (IPEDS) database ($N = 240$). Any institution, public or private, that participates in the funding provided by Title IV of the Higher Education Act of 1965, as amended, are required to submit data in a specific format and in a timely and accurate fashion in order to continue participation which includes federal student financial aid assistance. The Higher Education Act of 1992 authorized IPEDS as the official database requiring accurate reporting by participating institutions via a survey tool mandated by 20 USC 1094, Section 487(a)(17) and 34 CFR 668.14(b)(19) (National Center for Education Statistics, 2011).

Instrumentation

The study utilized the data from the surveys created, maintained, and archived by IPEDS. As a result of the federal mandate, IPEDS survey response rates are nearly 100% (Knapp et al., 2010). The IPEDS web-based data collection screens and instructions for 2009-2010 are in eight forms with most forms well over 100 pages each and too large to attach to this study. A sample of the first page of the first form for the 2012-2013 survey is shown in Appendix E. The eight survey forms include institutional characteristics, completions, 12-month enrollment, fall enrollment, human resources, GASB financials, student financial aid, and graduation rates (National Center for Education Statistics, 2011). The data was collected based on the data query form steps described in the Data Collection section below and also in Appendix B.

Data Collection

Upon approval to proceed from the LSU Institutional Review Board and dissertation advisory committee, the researcher utilized information from the IPEDS Data Center. The IPEDS is authorized to collect and maintain the data and permits the National Center for Education Statistics (NCES) to “. . . collect, report, analyze, and disseminate statistical data related to education in the United States” under the Section 153 of the Education Sciences Reform Act of 2002 (National Center for Education Statistics, 2011). IPEDS electronically collects financial and descriptive data as a requirement of institutions participating in or applying to participate in federal financial aid programs. There are three major groups of variables in the study. The first variable is the dependent variable of freshman retention. The study defines freshman retention as the institution’s retention rate from fall to fall for first time, full time students. The second group of variables are the primary independent variables of financial characteristics as related to faculty salaries for public four-year SREB universities. The third group of variables includes the secondary independent variables of additional institutional characteristics of student and instruction staff by age, gender, ethnicity, rank, tenure, and contract length.

The NCES collects data on a specific survey format and schedule in a fall, winter, and spring data collection cycle but reports them annually (Knapp et al., 2010). The study queried data from all public post-secondary degree-granting institutions in the 16 SREB states (National Center for Education Statistics, 2011). The query collected the instructional expenses as a percent of total core expenses. The data from this query was downloaded into a Microsoft Excel spreadsheet and then was uploaded into the Statistical Package for the Social Sciences (SPSS) for analysis (Burton, 2011).

Data Analysis

Objectives One and Two

Descriptive statistics were used to describe the data collected from all variables (six related to faculty salaries) for objective one and for objective two (12 related to non-financial institutional characteristics). These results report unweighted data by institutional population descriptors.

Objectives Three, Four, and Five

Pearson Product Moment (r) correlation coefficients were used to describe the relationships between six classifications of all financial characteristics related to faculty salaries, the 11 institutional characteristics, and freshman retention. The effect size interpretation for the correlation coefficients are reported according to the recommendations from Davis (1971). (Kotrlík & Williams, 2003) An important association is defined as moderate association or higher.

Table 3. Davis' (1971) Guidelines for the Interpretation of Effect Size for Correlations

Coefficient	Effect size interpretation
.70 or higher	Very strong association
.50 to .69	Substantial association
.30 to .49	Moderate association
.10 to .29	Low association
.01 to .09	Negligible association

For objective three, Pearson Product Moment (r) correlation coefficients were used to describe the relationships between student retention rates and the potential explanatory variables. For objective three, the potential explanatory variables are the financial and non-financial characteristics of SREB universities. For objectives four and five, forward regression analysis was used to determine if a relationship exists between student retention rates and the potential explanatory variables. For objective four, forward regression analysis was used to determine if a

model exists that explains a significant proportion of the variance in student retention rates using the financial characteristics variables listed in objective one as potential explanatory variables. For objective five, forward regression analysis was used to determine if a model exists that explains an important proportion of the variance in student retention rates, after controlling for the non-financial characteristics of the institutions listed in objective two. The main purpose of the analysis of objective five was to determine if controlling the institutional variables would produce a regression model that improves the variance of the model produced in objective four.

The data set was analyzed using forward multiple regression analysis (Hair, Black, Babin, Anderson, & Tatham, 2006) to determine the proportion of variance in student retention that was explained by the selected independent variables. Institutions in the IPEDS data set that were not accredited by SREB, institutions that did not provide complete data in the variable category, and institutions identified as outliers during the regression analysis were removed from the data set. The dataset was also analyzed for multicollinearity (Ryan, 2004) using tolerance statistics.

Effect size measures were used to measure and interpret effect size for the regression analysis. The multiple regression coefficient, R^2 , was used as the accepted measure of effect size (Cohen, 1988). This coefficient represents the proportion of variance in the dependent variable explained by the independent variables. The effect size for R^2 was interpreted using Cohen's descriptors for the R^2 coefficient below:

.0196 to .1299: Small effect size

.1300 to .2599: Medium effect size

.2600 or larger: Large effect size

Pilot Test

A pilot test was conducted to assess IPEDS data retrieval methods, the availability of the data, and to assess the database's suitability for the research study. The data collection procedures described above were used to collect data for three institutions that would be rejected from the study as not SREB accredited and included Arizona, Oregon, and Idaho. The pilot test was created to determine acceptability of data extraction methods and calculations. The results for the pilot test indicated the data was available for the year 2009 but not all data was available for the year 2010. This result indicated the study would be limited to 2009 and indicated that no changes are needed for the study.

Institutional Review Board Approval

The researcher completed the prerequisite for the application by completing the National Institutes of Health (NIH) Office of Extramural Research web-based training course titled "Protecting Human Research Participants" (see Appendix C). Approval for the proposed study was obtained through the Louisiana State University Institutional Review Board (LSU IRB), IRB number E5913, for Human Subject Protection prior to data collection (see Appendix D).

CHAPTER 4: RESULTS

The purpose of this study was to determine if a model exists that allocates faculty salary outlays in a manner that increases freshman retention for public four-year universities in the 16 states of the Southern Region Education Board (SREB). This study utilized the data reported to the Integrated Postsecondary Education Data System (IPEDS) for the academic year 2009-2010 for 240 public four-year universities located in SREB states. The resulting data collection was converted to a Microsoft Excel spreadsheet for analysis. The variables retrieved for the study are presented below. The spreadsheet was then compared to data from the U.S. Department of Education which listed accrediting agencies for each institution. If a school was not accredited by a regional accreditation agency, it was removed from this study. This procedure revealed that all schools were appropriately accredited resulting in none being removed from the study for this criteria. After this procedure, all schools remained in the study for analysis. SPSS statistical software, version 19, was used in the data analysis process.

The information retrieved from the IPEDS Data Center included student population data and financial expenditure data recorded as whole numbers or integers. The IPEDS information reported in this study came directly from the IPEDS database and without fractional or decimal parts. For example, maximum and minimum values for each variable are reported as indicated without fractional or decimal parts.

Objective One Results – Describing the Financial Characteristics

Describe the following financial characteristics as related to faculty salaries for public four-year SREB universities. The financial characteristics include

- Average salary outlays of full-time instructional faculty
- Average fringe benefits outlays of full-time instructional faculty
- Instructional expenses as a percent of total core expenses

- Proportion of university expenses paid by financial aid
- Total amount spent on core institutional expenditures
- Comparable wage index

Objective one data produced the descriptive statistics of the mean and standard deviation to measure the data in terms of dispersion and distribution.

Table 4. Selected Statistical Descriptors of Financial Independent Variables for Public Four-year Universities in the Southern United States.

Variable	<i>N</i>	<i>M</i>	<i>SD</i>
Financial independent variables:			
Salary outlays of full time instructional faculty (\$) ^{a,d}	240	32,816,280.24	38,866,648.05
Fringe benefit outlays of full time instructional faculty (\$) ^{b,e}	240	8,831,957.80	10,159,904.47
Instructional expenses as a percent of total core expenses (%) ^{g,f}	237	43.94	7.55
Proportion of university expenses paid by financial aid (%) ^{f,h}	237	14.09	10.38
Total amount spent on core institutional expenses (\$) ⁱ	240	224,987,476.60	322,000,000.00
Comparable wage index by region ^c	240	.008	.0009

^aFull time instructional faculty are those members of the instruction/research staff who are employed full time and whose major regular assignment is instruction, including those with released time for research and includes full-time faculty for whom it is not possible to differentiate between teaching, research and public service because each of these functions is an integral component of their regular assignment (IPEDS' IES Glossary, 2011).

^bFringe benefits are cash contributions in the form of supplementary or deferred compensation other than salary, excluding the employee's contribution, but including retirement plans, social security taxes, medical/dental plans, guaranteed disability income protection plans, tuition plans, housing plans, unemployment compensation plans, group life insurance plans, worker's compensation plans, and other benefits in-kind with cash options (IPEDS' IES Glossary, 2011)

^cMinimum = .0074, maximum = .0094, median = .0074.

^dMinimum = \$1,344,576.00, maximum = \$235,941,271.00.

^eMinimum = \$388,481.00, maximum = \$59,276,669.00.

^fThree of the 240 schools did not report this data.

^gMinimum = 19.31, maximum = 61.24.

^hMinimum = 0.05, maximum = 56.07.

ⁱMinimum = \$12,690,722.00, maximum = \$2,070,366,000.00.

Average Salary Outlays of Full-Time Instructional Faculty

The first variable measured was the average salary outlay of full-time instructional faculty. The average salary outlay allocated to full-time instructional faculty was \$32,816,280.24 ($N = 240$, $SD = \$38,866,648.05$, see Table 4). The maximum salary outlay measured was \$235,941,271.00 while the minimum salary outlay reported was \$1,344,576.00. About half of the schools reported salary outlays below 20 million dollars (see Table 5). The salary outlay categories of full-time instructional faculty in twenty million dollar increments and is displayed in Table 5. Over half of the schools spent less than \$20 million on full-time instructional faculty in fall, 2009.

Table 5. Salary Outlays of Full-time Instructional Faculty in Public Four-year Universities in the Southern United States, Fall 2009.

Salary outlays of full-time instructional faculty	<i>N</i>	%
\$19,999,999.99 or less	133	55.42
\$20 million to \$39,999,999.99	44	18.33
\$40 million to \$59,999,999.99	22	9.17
\$60 million to \$79,999,999.99	14	5.83
\$80 million to \$99,999,999.99	11	4.58
\$100 million or more	16	6.67
Total	240	100.00

Note. $N = 240$, $M = \$32,816,280.24$, $SD = \$38,866,648.05$, minimum = \$1,344,576.00, maximum = \$235,941,271.00.

Average Fringe Benefits Outlays of Full-Time Instructional Faculty

The second variable measured was the average fringe benefits outlays of full-time instructional faculty. The average fringe benefit outlay allocated to full-time instructional faculty was \$8,831,957.80 ($N = 240$, $SD = \$10,159,904.47$, see Table 4). The minimum fringe benefit outlay was \$388,481.00 and the maximum fringe benefit outlay reported was \$59,276,669.00. Only 12 schools reported fringe benefit outlays of less than one million dollars and 30 schools reported fringe benefit outlays of more than twenty million dollars (see Table 6).

Table 6. Fringe Benefit Outlays of Full-time Instructional Faculty in Public Four-year Universities in the Southern United States, Fall 2009.

Fringe benefit outlays of full-time instructional faculty	<i>N</i>	%
\$999,999.99 or less	12	5.00
\$1 million to \$1,999,999.99	31	12.92
\$2 million to \$2,999,999.99	30	12.50
\$3 million to \$3,999,999.99	26	10.83
\$4 million to \$4,999,999.99	23	9.58
\$5 million to \$5,999,999.99	17	7.08
\$6 million to \$6,999,999.99	13	5.42
\$7 million to \$7,999,999.99	16	6.67
\$8 million to \$8,999,999.99	8	3.33
\$9 million to \$9,999,999.99	3	1.25
\$10 million to \$10,999,999.99	4	1.66
\$11 million to \$11,999,999.99	7	2.92
\$12 million to \$12,999,999.99	3	1.25
\$13 million to \$13,999,999.99	1	.42
\$14 million to \$14,999,999.99	1	.42
\$15 million to \$15,999,999.99	5	2.08
\$16 million to \$16,999,999.99	3	1.25
\$17 million to \$17,999,999.99	1	.42
\$18 million to \$18,999,999.99	3	1.25
\$19 million to \$19,999,999.99	3	1.25
\$20 million or more	30	12.50
Total	240	100.00

Note. $N = 240$, $M = \$8,831,957.80$, $SD = \$10,159,904.47$, minimum = \$388,481.00, maximum = \$59,276,669.00.

Instructional Expenses as a Percent of Total Core Expenses

The third variable measured was the percent of total core expenses spent on instruction. For comparison purposes regarding salary outlays, fringe benefit outlays, and core expenditures, the instructional expenses are displayed in twenty million dollar increments in Table 7 and the variable instructional expenses as a percent of total core expenses are illustrated in Table 8. The minimum amount of instructional expenses reported was \$5,766,956.00 and the maximum reported was \$726,463,052.00 (see Table 7). The average amount of instructional expenses reported was \$91,058,276.87 ($N = 237$, $SD = \$118,197,979.60$, see Table 7).

Table 7. Instructional Expenses of Public Four-year Universities in the Southern United States, Fall 2009

Instructional expenses	<i>N</i>	%
\$19,999,999.99 or less	46	19.41
\$20 million to \$39,999,999.99	59	24.90
\$40 million to \$59,999,999.99	37	15.61
\$60 million to \$79,999,999.99	20	8.44
\$80 million to \$99,999,999.99	14	5.91
\$100 million to \$119,999,999.99	8	3.38
\$120 million to \$139,999,999.99	8	3.38
\$140 million to \$159,999,999.99	6	2.53
\$160 million to \$179,999,999.99	7	2.96
\$180 million to \$199,999,999.99	1	0.42
\$200 million to \$219,999,999.99	3	1.26
\$220 million to \$239,999,999.99	2	0.84
\$240 million to \$259,999,999.99	8	3.38
\$260 million to \$279,999,999.99	4	1.68
\$280 million to \$299,999,999.99	2	0.84
\$300 million to \$319,999,999.99	3	1.26
\$320 million or more	9	3.80
Total	237	100.00

Note. $N = 237$, $M = \$91,058,276.87$, $SD = 118,197,979.60$, minimum = \$5,766,956.00, maximum = \$726,463,052.00, 3 schools did not report this data.

The average percentage of total core expenses that were allocated to instruction was 43.94% ($N = 237$, $SD = 7.55$, see Table 4). Only one school reported less than 20.00% of instructional expenses as a percent of total core expenses at 19.31%. Only one school reported greater than 60.00% of instructional expenses as a percent of total core expenses. As shown in Table 8, slightly over half of the schools, 122 or 51.47%, reported between 40.00% and 49.99% of instructional expenses as a percent of total core expenses (see Table 8).

Proportion of University Expenses Paid by Financial Aid

The fourth variable measured was the proportion of university expenses paid by financial aid. The average proportion of financial aid support to universities was 14.09% ($N = 237$, $SD = 10.38$, see Table 4). The distribution of the percentages of university expenses paid by financial

aid is displayed in Table 9. Twenty-one schools reported more than 30.00% of university expenses paid by financial aid (see Table 9).

Table 8. Instructional Expenses as a Percent of Total Core Expenses in Public Four-year Universities in the Southern United States, Fall 2009.

Instructional expenses as a percent of total core expenses	<i>N</i>	%
Less than 10.00	0	0.00
10.00 to 19.99	1	0.42
20.00 to 29.99	8	3.38
30.00 to 39.99	56	23.63
40.00 to 49.99	122	51.47
50.00 to 59.99	49	20.68
60.00 and above	1	0.42
Total	237	100.00

Note. $N = 237$, $M = 43.94$, $SD = 7.55$, minimum = 19.31, maximum = 61.24. Three schools did not report this information.

Table 9. Proportion of University Expenses Paid by Financial Aid in Public Four-year Universities in the Southern United States, Fall 2009.

Proportion of university expenses paid by financial aid	<i>N</i>	%
0.00 to 4.99	42	17.72
5.00 to 9.99	52	21.94
10.00 to 14.99	50	21.10
15.00 to 19.99	36	15.19
20.00 to 24.99	22	9.28
25.00 to 29.99	14	5.91
30.00 and above	21	8.86
Total	237	100.00

Note. $N = 237$, $M = 14.09$, $SD = 10.38$, minimum = 0.05, maximum = 56.07. Three schools did not report this data.

Total Amount Spent on Core Institutional Expenditures

The fifth variable measured was the total amount spent on core institutional expenditures. The average amount spent on core expenses was \$224,987,476.60 ($N = 240$, $SD =$ \$322,000,000.00, see Table 4). The distribution of core institutional expenditures reported by quarter billion dollar increments is displayed in Table 10. Further examination of the data revealed 73.75% of the 240 schools reported core institutional expenditures below

\$225,000,000.00. The maximum reported was more than two billion dollars in core institutional expenditures at \$2,070,366.00. At one end of the distribution it appears that almost three-fourths of the schools (177) spent less than \$225,000,000.00. On the other end of the distribution 31 schools spent between \$225,000,000.00 and \$499,999,999.99 and 10 spent more than one billion dollars on core institutional expenditures (see Table 10).

Table 10. Total Amount Spent on Core Institutional Expenditures in Public Four-year Universities in the Southern United States, Fall 2009.

Total amount spent on core institutional expenditures	<i>N</i>	%
Less than \$225,000,000	177	73.75
\$225,000,000 to \$499,999,999	31	12.92
\$500,000,000 to \$749,999,999	16	6.67
\$750,000,000 to \$999,999,999	6	2.50
More than \$1,000,000,000	10	4.16
Total	240	100.00

Note. *N* = 240, *M* = 224,987,476.60, *SD* = \$322,000,000.00, minimum = \$12,690,722.00, maximum = \$2,070,366.00.

Comparable Wage Index

The sixth variable measured was the comparable wage index (CWI). The data is taken directly from the NCES database using the Regional CWI data (Taylor, Glander, Flower & Johnson, 2007). The NCES database combines baseline estimates from the 2000 United States census data with annual data from the Bureau of Labor Statistics. This creates an index that accounts for regional geographic variations in the general wage level. To normalize expenditures across the United States, a researcher can use the regional index number with the state or national average to adjust the dollar amounts. All of the 240 public four-year universities in the Southern United States fell into only three different census regional indices. The median comparable wage index was .0074 (*N* = 240) with .0074 reported as the minimum comparable wage index and .0094 as the maximum regional index (see Table 4). Table 11

shows the distribution of the schools in the different regional indices. About half, or 52.50% fell into the .0074 CWI region, while 38 schools or 15.83% were in the .0082 CWI region. Another 31.67%, or 76 schools, fell into the .0094 CWI region (see Table 11).

Table 11. Proportion of Public Four-year Universities in the Southern United States by Regional Comparable Wage Index, Fall 2009.

Distribution of institutions by comparable wage index region	<i>N</i>	%
.0074 Region	126	52.50
.0082 Region	38	15.83
.0094 Region	76	31.67
Total	240	100.00

Note. *N* = 240, median = .0074, minimum = .0074, maximum = .0094. The Comparable Wage Index is a measure of wages in labor markets using the regional variation in salaries of college graduates who are not educators and is used to make comparisons across geographic areas (NCES, 2004; Taylor, Glander, Flower & Johnson, 2007). The 240 public four-year universities in the Southern United States fall into the three regions indicated above.

Objective Two Results – Describing the Non-Financial Characteristics

Objective two was to describe the non-financial characteristics of public four-year SREB universities. The 12 non-financial characteristics selected for this study include the dependent variable of student retention rates and the independent variables below:

- Student retention rates of first-time bachelor's or equivalent degree-seeking undergraduate full-time students, fall-to-fall
- The total number of undergraduate students enrolled in the institution
- The number of full-time equivalent undergraduate students
- The percentage of total undergraduate student enrollment in each of the following ethnic groups: White non-Hispanic, Black non-Hispanic, Hispanic, Asian or Pacific Islander, and American Indian or Alaska Native
- The percentage of total student enrollment by gender
- The average undergraduate student age at institution

- The percentage of full-time instructional faculty
- The percentage of full-time instructional faculty by gender
- The percentage of full-time instructional faculty in each of the following ethnic groups: White non-Hispanic, Black non-Hispanic, Hispanic, Asian or Pacific Islander, and American Indian or Alaska Native
- The percentage of full-time instructional faculty by academic rank as follows: professor, associate professor, assistant professor, instructor, and lecturer
- The percentage of full-time instructional faculty by tenure status as follows: tenured, tenure-track, and non-tenured
- The percentage of full-time instructional faculty by contract length as follows: 9/10 month contract or 11/12 month contract

Objective two data produced the descriptive statistics of the mean and standard deviation to measure the data in terms of dispersion and distribution.

Student Retention Rates

The first non-financial variable measured was the dependent variable of retention rates of first-time full-time freshmen students. The average retention rate of first-time full-time freshmen students as a percent of all undergraduates was 17.04% ($N = 240$, $SD = 5.66$) (see Table 12).

The data shown in Table 13 indicates 4 of these 240 schools reported retention rates less than 4.99% and 4 reported a retention rate percentage greater than 30.00%. Further examination of the data revealed the largest percentage of schools at 36.67% had a retention rate between 15.00% and 19.99% (see Table 13).

Table 12. Statistical Descriptors of Non-Financial Independent Variables and the Dependent Variable of Retention Rate for Public Four-year Universities in the Southern United States, Fall 2009.

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	Min ^a	Max ^b
Dependent variable:					
Retention rate percentage of full time, first time freshmen retained from fall to fall ^c	240	17.04	5.66	1.00	40.00
Non-financial independent variables:					
Total number of undergraduate students	240	10,620.86	9,110.60	747.00	59,120.00
Number of full time equivalent undergraduate students ^d	240	8,982.31	7,597.65	697.20	38,587.21
Undergraduate student ethnicity ^e					
White non-Hispanic percentage	138	54.63	27.63	.87	93.01
Black non-Hispanic percentage	138	23.72	27.65	.35	96.87
Hispanic percentage	138	12.55	19.99	.33	93.40
Race/ethnicity unknown	138	5.08	4.77	.00	26.24
Asian or Pacific Islander percentage	138	3.30	4.05	.14	22.41
American Indian or Alaska Native percentage	138	.72	1.63	<.01	14.12
Undergraduate student enrollment by gender:					
Male percentage	240	43.21	9.08	8.32	92.28
Female percentage	240	56.79	9.08	7.72	91.68
Average undergraduate student age	240	23.56	2.17	19.81	33.57
Ratio of full time instructional faculty ^f as a percentage of all employee ^g					
	240	26.09	6.26	7.77	40.50
Full time instructional faculty by gender:					
Male percentage	240	55.42	7.77	25.35	81.82
Female percentage	240	44.58	7.77	18.18	74.65
Full time instructional faculty ^f by ethnicity ^h :					
White non-Hispanic percentage	163	72.41	21.57	12.58	96.30
Black non-Hispanic percentage	163	11.99	18.71	<.01	76.10
Hispanic percentage	163	4.30	6.75	<.01	50.20
Asian or Pacific Islander percentage	163	6.61	4.47	<.01	20.86
Race or ethnicity unknown	163	4.06	4.73	<.01	28.51
American Indian or Alaska Native percentage	163	.64	1.38	<.01	11.97
Full time instructional faculty ^f by academic rank ⁱ :					
Percentage of full-time professors	234	23.57	10.92	.00	98.70
Percentage of associate professors	234	24.14	7.17	.00	42.11
Percentage of assistant professors	234	30.21	10.69	.00	71.97
Percentage of instructors	234	12.81	14.31	.00	100.00

(Table 12 continued)

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	Min ^a	Max ^b
Percentage of lecturers	234	5.51	8.52	.00	42.11
Percentage of other academic rank	234	3.76	14.01	.00	53.22
Full time instructional faculty ^f by tenure ^j status ^k :					
Percentage of tenured or tenure track faculty	209	44.23	18.35	.00	100.00
Percentage of non-tenured faculty on tenure track	209	26.82	13.08	.00	100.00
Percentage of faculty not on tenure track or no tenure system	209	28.95	24.52	.00	100.00
Full time instructional faculty ^f by length of contract ^l :					
Percentage of faculty on 9 or 10 month contract	234	88.06	13.23	.00	100.00
Percentage of faculty on 11 or 12 month contract	234	11.94	13.23	.00	100.00

^aMin = minimum value reported. ^bMax = maximum value reported.

^cRetention rate is the rate at which students persist and graduate (Tinto, 2006). Persistence is the student's decision to reenroll at an institution for fall (Braxton et al, 2008). First time students are students who have no prior postsecondary experience attending any institution for the first time at the undergraduate level and includes students enrolled in the fall term who attended college for the first time in the prior summer term and students who entered with advance standing with college credits earned before graduate from high school (IPEDS' IES Glossary, 2011).

^dFull time equivalent students is the number of all students attending part-time and full-time divided by the institution's hours required for full-time students and includes high school students in dual enrollment programs (IPEDS' IES Glossary, 2011).

^eOf the 240 schools in the study, 110 did not report student race or ethnicity.

^fFull time instructional faculty are those members of the instruction/research staff who are employed full time and whose major regular assignment is instruction, including those with released time for research. Also includes full-time faculty for whom it is not possible to differentiate between teaching, research, and public service because each of these functions is an integral component of his/her regular assignment (IPEDS' IES Glossary, 2011).

^gThe ratio of full-time instructional faculty is the total full-time instruction instructional faculty number reported in IPEDS divided by the total number of all employees reported by the institution in IPEDS.

^hOf the 240 schools in the study, 77 did not report faculty race or ethnicity data.

ⁱOf the 240 schools in this study, 6 did not report the rank of faculty data.

^jTenure is the status of a personnel position with respect to the permanence of a certain position (IPEDS' IES Glossary, 2011).

^kOf the 240 schools in this study, 31 did not report the tenure status of faculty data.

^lSix schools did not report faculty contract length data

Table 13. Retention Rate Percentage of Full Time, First-Time Freshmen Retained from Fall to Fall in Public Four-year Universities in the Southern United States, Fall 2009.

Retention rate percentage	<i>N</i>	%
Less than 4.99	4	1.67
5.00 to 9.99	18	7.50
10.00 to 14.99	54	22.50
15.00 to 19.99	88	36.67
20.00 to 24.99	62	25.83
25.00 to 29.99	10	4.16
More than 30.00	4	1.67
Total	240	100.00

Note. $N = 240$, $M = 17.04$, $SD = 5.66$, minimum = 1.00, maximum = 40.00.

Total Number of Undergraduate Students

The second variable measured was the total number of all undergraduate students. The mean for total number of undergraduate students was 10,620.86 ($N = 240$, $SD = 9,110.60$) (see Table 12). The minimum total number of undergraduate students reported for the 240 public four-year universities in the Southern United States in the fall semester of 2009 was 747.00 students and the maximum number reported was 59,120.00 students (see Table 14).

Table 14. Total Number of Undergraduate Students in Public Four-year Universities in the Southern United States, Fall 2009.

Total number of undergraduate students	<i>N</i>	%
Less than 4,999	80	33.33
5,000 to 9,999	71	29.58
10,000 to 14,999	26	10.83
15,000 to 19,999	27	11.25
20,000 to 24,999	16	6.67
More than 25,000	20	8.34
Total	240	100.00

Note. $N = 240$, $M = 10,620.86$, $SD = 9,110.60$, minimum = 747.00, maximum = 59,120.00.

Number of Full-time Equivalent Undergraduate Students

The third variable measured was the number of full-time equivalent undergraduate students. The average number of full-time equivalent undergraduate students was 8,982.31 ($N = 240$, $SD = 7,597.65$) (see Table 12). The distribution categories in Table 14 and 15 are the same

for comparison purposes. The data displayed in Table 15 indicates 40.83% of public four-year universities in the southern United States reported less than 5,000 full-time equivalent undergraduate students for the fall semester of 2009 (see Table 15).

Table 15. Number of Full-time Equivalent Undergraduate Students in Public Four-year Universities in the Southern United States, Fall 2009.

Number of full-time equivalent undergraduate students	<i>N</i>	%
Less than 4,999	98	40.83
5,000 to 9,999	65	27.08
10,000 to 14,999	29	12.08
15,000 to 19,999	24	10.00
20,000 to 24,999	15	6.25
More than 25,000	9	3.76
Total	240	100.00

Note. $N = 240$, $M = 8,982.31$, $SD = 7,597.65$, minimum = 697.20, maximum = 38,587.21.

Percentage of Total Undergraduate Student by Ethnicity

The fourth variable measured was the percentage of total undergraduate student enrollment in each of the following ethnic groups: white non-Hispanic, black non-Hispanic, Hispanic, Asian or Pacific Islander, and American Indian or Alaska native. The largest ethnic group reported was white non-Hispanic undergraduate student enrollment with an average percentage of 54.63% ($N = 138$, $SD = 27.63$). The next largest ethnic group reported was black non-Hispanic undergraduate student enrollment with an average of 23.72% ($N = 138$, $SD = 27.65$). The schools reporting undergraduate student enrollment race or ethnicity unknown totaled 102 schools or 42.50% of the 240 schools in the study (see Table 12).

Percentage of Total Student Enrollment by Gender

The fifth variable measured was percentage of total student enrollment by gender. The average number of male students was 43.21% ($N = 240$, $SD = 9.08$). Conversely, the average number of female students was 56.79% ($N = 240$, $SD = 9.08$) (see Table 12). As indicated by the

maximum percentage values, no public four-year universities in the southern United States reported 100.00% of students in a single gender (see Table 12).

Average Undergraduate Student Age at Institution

The sixth variable measured was the average undergraduate student age at the institution. The average age of undergraduate students reported was 23.56 ($N = 240$, $SD = 2.17$) (see Table 12). The minimum average undergraduate student age was reported as 19.81 years and the maximum average undergraduate student age was reported as 33.57 years (see Table 12).

Percentage of Full-time Instructional Faculty

The seventh variable measured was the average number of full-time instructional faculty which was the total full-time instruction instructional faculty number divided by the total number of all employees both reported by the institution in IPEDS. The average full-time instructional faculty was 26.09% ($N = 240$, $SD = 6.26$) (see Table 12). The highest percentage of full-time instructional faculty reported was 40.50% and the minimum reported ratio of full-time instructional faculty reported was 7.77% of all employees (see Table 12).

Percentage of Full-time Instructional Faculty by Gender

The eighth variable measured was percentage of full-time instructional faculty by gender. The average number of male faculty was 55.42% ($N = 240$, $SD = 7.77$). Conversely, the average number of female faculty was 44.58% ($N = 240$, $SD = 7.77$) (see Table 12). The maximum male full-time instructional faculty ratio reported was 81.82% while the highest female full-time instructional faculty ratio reported was 74.65% (see Table 12).

Percentage of Full-time Instructional Faculty by Ethnicity

The ninth variable measured was the percentage of full-time instructional faculty in each of the following ethnic groups: White non-Hispanic, Black non-Hispanic, Hispanic, Asian or Pacific Islander, and American Indian or Alaska native. The largest ethnic group reported was

white non-Hispanic undergraduate faculty with an average number of 72.41% ($N = 163$, $SD = 21.57$). The schools reporting full-time instructional faculty race or ethnicity unknown was 77 schools or 32.08% of the 240 schools in the study (see Table 12).

Percentage of Full-time Instructional Faculty by Academic Rank

The 10th variable measured was the percentage of full-time instructional faculty by academic rank. Additional examination of the data revealed six of the 240 institutions in the population did not report data for this variable. The average number of professors was 23.57% ($N = 234$, $SD = 10.92$). The average number of associate professors was 24.14% ($N = 234$, $SD = 7.17$). The average number of assistant professors was 30.21% ($N = 234$, $SD = 10.69$). The average number of instructors was 12.81% ($N = 234$, $SD = 14.31$). The average number of lecturers was 5.51% ($N = 234$, $SD = 8.52$, see Table 12).

Percentage of Full-time Instructional Faculty by Tenure Status

The 11th variable measured was the percentage of full-time instructional faculty by tenure status. Additional examination of the data revealed 31 of the population of 240 institutions did not report the tenure status of the faculty for Fall 2009 resulting in their removal from descriptive statistics by the statistical software. The average number of tenured full-time instructional faculty was 44.23% ($N = 209$, $SD = 18.35$). The average number of non-tenured full-time instructional faculty on tenure-track was 26.82% ($N = 209$, $SD = 13.08$). The average number of non-tenured full-time instructional faculty or non-tenured full-time instructional faculty employed by institutions with no tenure system reported was 28.95% ($N = 209$, $SD = 24.52$) (see Table 12).

Percentage of Full-time Instructional Faculty by Contract Length

The 12th non-financial variable measured was the percentage of full-time instructional faculty by contract length. Additional examination of the data revealed 6 of the population of

240 institutions did not report the contract length of the full-time instructional faculty removing them from the descriptive statistics analysis. The average number of full-time instructional faculty on a 9 or 10 month contract was 88.06% ($N = 234$, $SD = 13.23$). The average number of full-time instructional faculty on an 11 or 12 month contract was 11.94% ($N = 234$, $SD = 13.23$) (see Table 12).

Objective Three Results – Correlation Between Student Retention Rates and Selected Financial and Non-Financial Independent Variables

Objective three was to determine if a relationship exists between student retention rates and the financial and non-financial characteristics of SREB universities. A Pearson product-moment correlation coefficient was computed to assess the relationship between the fall-to-fall retention rates of first-time full-time students in the Southern United States and

- Average salary outlays of full-time instructional faculty
- Average fringe benefits outlays of full-time instructional faculty
- Instructional expenses as a percent of total core expenses
- Proportion of university expenses paid by financial aid
- Total amount spent on core institutional expenditures
- Proportion of universities by comparable wage index
- The total number of undergraduate students enrolled in the institution
- The number of full-time equivalent undergraduate students
- The percentage of total undergraduate student enrollment in each of the following ethnic groups: White non-Hispanic, Black non-Hispanic, Hispanic, Asian or Pacific Islander, American Indian or Alaska Native
- The percentage of total student enrollment by gender
- The average undergraduate student age at institution

- The percentage of full-time instructional faculty
- The percentage of full-time instructional faculty by gender
- The percentage of full-time instructional faculty in each of the following ethnic groups: White non-Hispanic, Black non-Hispanic, Hispanic, Asian or Pacific Islander, American Indian or Alaska Native
- The percentage of full-time instructional faculty by academic rank as follows: professor, associate professor, assistant professor, instructor, and lecturer
- The percentage of full-time instructional faculty by tenure status as follows: tenured, tenure-track, and non-tenured
- The percentage of full-time instructional faculty by contract length as follows: 9/10 month contract or 11/12 month contract

Data for this study included the entire population, not sample data, enumeration, and nonrandom data. When entering the data into statistical software package, cases were omitted in the statistical analysis if data was missing on any of the variables included in the analysis. The need for significance testing is eliminated in data using the entire population since there is no sampling error (Hair et al., 2006). However, Garson (2001) indicates significance levels can be reported “. . . in order to follow social science convention” (p. 198). The significance reported is two-tailed. Since the entire population is included instead of a random sample, the correlations calculated for the population parameter are the actual relationships between fall-to-fall retention rates of first-time full-time students in the Southern United States and each of the 6 financial and 11 non-financial independent variables listed. The actual computed Pearson Product Moment correlations are reported in Table 16. These correlations were used to interpret the effect sizes for the correlations according to the guidelines published by Davis (1971). If the coefficient is

Table 16. Pearson Correlations between Fall-to-Fall Retention Rates of First-Time, Full-Time Undergraduate Students in the Public Four-year Universities in the Southern United States and Selected Financial and Non-Financial Independent Variables, Fall 2009.

Variable	<i>r</i>	<i>p</i>	<i>N</i>
Financial independent variables:			
Comparable wage index	-.21 ^b	<.001	240
Salary outlays of full time instructional faculty	.05 ^a	.489	240
Fringe benefit outlays of full time instructional faculty	.05 ^a	.410	240
Instructional expenses as a percent of total core expenses	.05 ^a	.493	237
Proportion of university expenses paid by financial aid	.03 ^a	.700	237
Total amount spent on core institutional expenses	<-.01 ^a	.964	240
Non-financial independent variables:			
Total number of undergraduate students	-.23 ^b	<.001	240
Number of full time equivalent undergraduate students	-.12 ^b	.064	240
Undergraduate student ethnicity:			
Hispanic percentage	-.30 ^c	<.001	138
Black non-Hispanic percentage	.17 ^b	.041	138
Asian or Pacific Islander percentage	-.17 ^b	.046	138
White non-Hispanic percentage	.07 ^a	.435	138
American Indian or Alaska Native percentage	.02 ^a	.781	138
Undergraduate students by percentage of males	.30 ^c	<.001	240
Average undergraduate student age	-.71 ^d	<.001	240
Ratio of full time instructional faculty as a percentage of all employees	.22 ^b	<.001	240
Full time instructional faculty by percentage of males	.26 ^b	<.001	240
Full time instructional faculty by ethnicity:			
Hispanic percentage	-.29 ^b	<.001	163
Black non-Hispanic percentage	.20 ^b	.011	163
American Indian or Alaska Native percentage	-.07 ^a	.348	163
White non-Hispanic percentage	-.06 ^a	.480	163
Asian or Pacific Islander percentage	-.01 ^a	.906	163
Full time instructional faculty by academic rank:			
Percentage of assistant professors	.07 ^a	.321	234
Percentage of associate professors	.05 ^a	.491	234
Percentage of instructors	.05 ^a	.462	234
Percentage of full-time professors	.03 ^a	.621	234
Percentage of lecturers	-.01 ^a	.873	234
Full time instructional faculty by tenure status:			
Percentage of tenured faculty	-.10 ^b	.159	209
Percentage of non-tenured faculty on tenure track	.07 ^a	.335	209
Percentage of faculty not on tenure track or no tenure system	.04 ^a	.592	209
Full time instructional faculty by length of contract:			
Percentage of faculty on 9 or 10 month contract	.08 ^a	.205	240
Percentage of faculty on 11 or 12 month contract	-.08 ^a	.205	240

Note. Pearson Product Moment correlations were used. The effect sizes for the correlations were interpreted according to the guidelines published by Davis (1971).

Davis' (1971) Guidelines for the Interpretation of Effect Size for Correlations

Coefficient : Effect Size Interpretation:

.70 or higher = Very strong association

.50 to .69 = Substantial association

.30 to .49 = Moderate association

.10 to .29 = Low association

.01 to .09 = Negligible association

^aNegligible association. ^bLow association. ^cModerate association. ^dVery strong association.

.70 or higher, the effect size is interpreted to be a very strong association to the dependent variable. A coefficient ranging from .50 to .69 indicates a substantial association, a coefficient from .30 to .49 indicates a moderate association, a coefficient from .10 to .29 indicates a low association, and a coefficient of .01 to .09 indicates a negligible association (Davis, 1971).

A correlation for the financial independent variable data revealed that only one of the financial independent variables, comparable wage index, is statistically significant and inversely related to the dependent variable, student retention rates ($r = -.21, N = 240, p < .001$). The effect size using descriptors developed by Davis (1971) indicates a low association between the two variables. The nature of this association was such that as the regional comparable wage index decreased, the student retention rate tended to increase (see Table 16). The multipliers involved with the regional comparable wage index determines that the regions with the smallest index multiplier result in an adjusted labor rate which is higher than the other two regions. The smallest index number results in the highest comparable wage. The largest index number results in the smallest comparable wage (Taylor et al., 2007). Consequently, the institutions located in the geographic regions with the smaller index, which equivocated to higher normalized wage dollars, had a higher student retention rate. The institutions located in the regions with a larger index reflecting lower wage values had lower student retention rates.

A correlation for the non-financial independent variable data revealed that seven of the non-financial variables are practically significant. The average undergraduate student age measure was statistically significant and inversely related to the dependent variable student retention rates ($r = -.71$, $N = 240$, $p < .001$) and found to have the highest degree of association among financial and non-financial variables. Davis' (1971) guidelines were used to interpret the effect sizes for the correlations as follows:

.70 or higher - very strong association

.50 to .69 - substantial association

.30 to .49 - moderate association

.10 to .29 - low association

.01 to .09 - negligible association

The relationship is classified as a very strong association using descriptors developed by Davis (1971). The nature of this association indicates smaller the average undergraduate student ages resulted in higher student retention rates. This relationship has been indicated in other studies (Snyder & Dillow, 2011) (see Table 16).

Of the remaining six independent non-financial variables indicating a correlation of practical significance, two had an effect size of moderate association using descriptors developed by Davis (1971). The correlation of student retention rates to undergraduate student enrollment by percentage by of males of $r = .30$ ($N = 240$, $p < .001$) reflects a moderate association effect size. The undergraduate Hispanic student percentage of $r = -.30$ ($N = 138$, $p < .001$) indicates an inverse moderate relationship with student retention rates (see Table 16). The student ethnicity relationship is described in other studies as a strong non-academic factor in college retention (Lotkowski et al., 2004)

The remaining four independent variables indicating a correlation of practical importance with student retention rates had an effect size of low association. The full time instructional faculty by ethnicity percentages indicate an inverse low relationship for Hispanic full time instructional faculty ($r = -.29, N = 163, p < .001$). The full time instructional faculty by gender ratios indicate a low relationship for male faculty ($r = .26, N = 240, p < .001$). The total number of undergraduate students had a low inverse relationship ($r = -.23, N = 240, p < .001$) indicating a higher student retention rate as the total number of undergraduate students decreased. The ratio of full time instructional faculty as a percentage of all employees ($r = .22, N = 240, p < .001$) also had a low relationship (see Table 16).

Objective Four Results – Forward Regression Analysis to Determine Model

Objective four was to determine if a model exists that explains a practically important proportion of the variance in undergraduate student retention rates using the financial variables listed in objective one as potential explanatory variables. Based on the review of the literature, 6 financial and 11 non-financial variables were identified as potential explanatory variables (Table 16). Forward regression analysis was chosen to determine if the financial characteristics of 240 SREB four-year universities explain a practically important proportion of the variance in student retention rates and the results are presented below and shown in Table 17.

Data were first reviewed for missing data. Three cases were removed for excessive missing data in selected variables resulting in a revised N of 237. Data was then screened for outliers. Univariate outliers for large populations have been defined by Tabachnick and Fidell (2007) as cases with less than a one in 2,000 chance of occurring. This definition interprets to a standardized score threshold of 3.29 standard deviations more than the mean or less than the mean. The outliers were identified by calculating Mahalanobis distance in a preliminary regression procedure (Mertler & Vannatta, 2005) for the independent financial variables of

Table 17. Forward Regression Analysis Model Explaining Variance in Student Retention Rates and the Potential Explanatory Financial Characteristics of Four-Year Public Universities in the Southern United States, Fall 2009.

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>			
Regression	265.01	1	265.01	8.86	.003			
Residual	6,716.69	227	29.59					
Total	6,981.70	228						
Change statistics								
Explanatory Variables in Model	<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	<i>SE</i>	<i>R</i> ² change	<i>F</i> change	<i>p</i> of <i>F</i> change	
Comparable Wage Index	.20	.04	.03	5.44	.04	8.96	.003	
Variable statistic and significance								
Variable					<i>t</i>	<i>p</i>		
Dependent variable: Student retention rates					8.14	<.001		
Included variables: Comparable wage index					-2.99	.003		
Excluded variables:								
Total amount spent on core institutional expenses					-.64	.521		
Instructional expenses as a percent of total core expenses					.55	.582		
Proportion of university expenses paid by financial aid					.44	.663		
Fringe benefit outlays of full time instructional faculty					.31	.759		
Salary outlays of full time instructional faculty					.23	.822		
VIF and multicollinearity of variants								
Variable					Tolerance	VIF		
Comparable wage index					1.00	1.00		
Total amount spent on core institutional expenses					1.00	1.00		
Salary outlays of full time instructional faculty					1.00	1.00		
Fringe benefit outlays of full time instructional faculty					.99	1.01		
Instructional expenses as a percent of total core expenses					.99	1.01		
Proportion of university expenses paid by financial aid					.98	1.02		

Note. *N* = 229. Dependent variable: Undergraduate student retention rates of first-time, full-time freshmen. The variable included in the forward regression model represents a small effect size according to Cohen (1988). Three of the 240 schools were missing data and 8 schools identified as extreme high outliers were removed.

average salary outlays of full-time instructional faculty, average fringe benefits outlays of full-time instructional faculty, instructional expenses as a percent of total core expenses, proportion of university expenses paid by financial aid, total amount spent on core institutional expenditures, and comparable wage index. The outliers identified were analyzed by this researcher and it determined that did not occur due to incorrect data entry. Extreme high outliers

were identified and removed from the analysis. No extreme low outliers were identified resulting in a total of 11 cases removed from the 240 in the study leaving 229 cases remaining. The outliers identified through this procedure and corresponding data were examined and removed from the dataset prior to the regression analysis.

A minimum of five observations per variable are required with 15 to 20 preferred for a forward regression analysis (Hair, Anderson, Tatham, & Black, 2006). Based on these recommendations, a minimum of 120 cases were preferred (6 variables x 20) observations per variable. The provision of 229 cases was adequate for the analysis for objective four (see Table 17).

Multicollinearity did not exist in the regression analysis. Hair et al. (2006) indicates two of the most common measurements for analyzing multiple variable collinearity are tolerance and the variance inflation factor. Specifically, "...a multiple correlation of .9 between one independent variable and all others...would result in a tolerance value of .19. Thus, any variables with tolerance values below .19 (or above a VIF of 5.3) would have a correlation of more than .90" (Hair et al., 2006, pp. 227, 230). None of the tolerance values observed was lower than .19 and none of the VIF values exceeded 5.3 (see Table 17).

The variable comparable wage index was the only variable included in the forward multiple regression analysis model, explaining only 4% of the variance ($R^2 = .04$, $p < .003$) in undergraduate student retention rates ($F = 8.96$, $p = .003$) in public four-year universities in the southern United States. The smaller comparable wage index (CWI) is indicative of higher comparable wage dollars and related to higher student retention rates. The higher CWI results in lower comparable wage dollars and related to lower student retention rates but explained only 4% of the variance with institutional student retention rates (see Table 17).

The effect size for R^2 was interpreted using Cohen's (Cohen, 1988) descriptors for the R^2 coefficient which describes a coefficient of .2600 or larger to indicate a large effect size, a coefficient of .1300 to .2599 indicating a medium effect size, and a coefficient of .0196 to .1299 indicating a small effect size. The effect size of $R^2 = .04$ represents a small effect size (see Table 17).

The financial variables selected from the review of the literature did not explain the variance in student retention rates with the exception of the comparable wage index. Those variables included total amount spent on core institutional expenses, instructional expenses as a percent of total core expenses, proportion of university expenses paid by financial aid, salary outlays of full time instructional faculty, fringe benefit outlays of full time instructional faculty (see Table 17).

Objective Five Results – Second Regression Analysis to Determine Model

Objective five was to uncover a model, if it exists, that explains an important proportion of the variance in student retention rates after controlling for the non-financial characteristics of the four-year public SREB universities. The main purpose of this analysis was to determine if controlling the non-financial institutional variables would produce a regression model that improves the variance of any model produced in objective four. In other words, after controlling for non-financial variables, do any of the financial variables explain a significant amount of the variance in student retention.

The objective was accomplished using multiple regression analysis with the fall-to-fall retention rates of first-time full-time undergraduate students in the public four-year universities in the southern United States as the dependent variable. Due to the large number of potential explanatory variables, it was determined a priori that only the independent non-financial

variables significantly correlated with the dependent variable of student retention rates would be utilized in the regression analysis as presented in Table 16.

Institutions in the IPEDS data set that did not provide complete data were removed from the analysis. In sample size determination considerations, “. . . the ratio of observations to independent variables should not fall below five” (Bartlett, Kotrlik, & Higgins, 2001, p. 48). Therefore, a minimum of five observations per variable are required with 15 to 20 preferred for a forward regression analysis (Hair et al., 2006). Based on these recommendations, a minimum of 55 cases (11 variables x 5) were required and 165 to 220 cases were preferred (11 variables x 15 or 20) observations per variable. The 11 cases identified in objective four as outliers remained deleted from this analysis. The provision of $N = 229$ cases exceeded the minimum and preferred observations per variable for the analysis.

Earlier examination of the data in this study revealed an excessive number (42.50% or 102 cases) of schools did not collect or report the ethnicity data of students and an excessive number (32.08% or 77 cases) of schools did not collect or report the ethnicity data of faculty (see Table 12). Mertler and Vannatta (2005, p. 62) recommend removing variables when more than 15% of the cases are missing data. Consequently, the forward regression analysis will not include the data on the variables of student or faculty ethnicity reducing the number of potential explanatory variables in the model to nine. Upon further review of the data, an absolute correlation of 1.00 existed between the gender ratios full time instructional faculty women and men so only one of the two genders, male, was chosen for this analysis. In addition, an absolute correlation of 1.00 existed between the gender ratios undergraduate student enrollment women and men so only one of the two genders, male, was chosen for this analysis.

The Pearson product moment correlations shown in Table 18 reveal all of the independent variables, financial and non-financial, included in the regression analysis are statistically correlated to the dependent variable fall-to-fall retention rates of first-time full-time undergraduate students in the public four-year universities in the southern United States. These correlations were used to interpret the effect sizes for the correlations according to the guidelines published by Davis (1971). If the coefficient is .70 or higher, the effect size is interpreted to be a very strong association to the dependent variable. A coefficient ranging from .50 to .69 indicates a substantial association, a coefficient from .30 to .49 indicates a moderate association, a coefficient from .10 to .29 indicates a low association, and a coefficient of .01 to .09 indicates a negligible association (Davis, 1971).

The average undergraduate student age is inversely correlated with the dependent variable student retention rates with a substantial association effect size as indicated by $r = -.73$ ($N = 229, p = <.001$). As the undergraduate student age goes down, the student retention rates go up. The total number of undergraduate students is inversely related to student retention rates ($r = -.26, N = 229, p = <.001$) but with a low effect size (Davis, 1971). As the total number of undergraduate students at a public four year university in the southern United States goes down, the student retention rates go up. The correlation between the dependent variable and the percentage of undergraduate male student enrollment ($r = .29, N = 229, p = <.001$), percentage of full time instructional male faculty ($r = .27, N = 229, p = <.001$), and the percentage of full time instructional faculty to all employees ($r = .25, N = 229, p = <.001$) were practically significant and reflect a positive relationship with a low effect size. As the percentage of undergraduate male student enrollment increased, so did the student retention rate. As the percentage of full time instructional male faculty increased, so did the student retention rate. As the percentage of

full time instructional faculty increased in relationship to the total number of employees, the student retention rate also increased. The correlation between the dependent variable and the lone financial independent variable, comparable wage index, is an inverse relationship with a low effect size ($r = -.25$, $N = 229$, $p = .002$). As the comparable wage index factor decreased, indicating a higher wage (Taylor et al., 2007), the student retention rate increased (see Table 18).

Table 18. Pearson Correlations between Student Retention Rates and Selected Financial and Non-Financial Independent Variables.

Variables	1	2	3	4	5	6	7
1-Fall to fall retention rate^a	1.00 (N/A)	-.26 (<.001)	.29 (<.001)	-.73 (<.001)	.25 (<.001)	.27 (<.001)	-.20 (.002)
2-Total number of undergraduate students	-.26 (<.001)	1.00 (N/A)	.13 (.024)	-.02 (.406)	-.30 (<.001)	.08 (.114)	-.08 (.124)
3-Undergraduate student enrollment by men %	.29 (<.001)	.13 (.024)	1.00 (N/A)	-.37 (<.001)	<.01 (.490)	.66 (<.001)	-.01 (.452)
4-Average undergrad student age	-.73 (<.001)	-.02 (.406)	-.37 (<.001)	1.00 (N/A)	-.32 (<.001)	-.38 (<.001)	.12 (.032)
5-Full time faculty % of all employees	.25 (<.001)	-.30 (<.001)	<.01 (.490)	-.32 (<.001)	1.00 (N/A)	.17 (.005)	.27 (<.001)
6-Full time instructional faculty by men %	.27 (<.001)	.08 (.114)	.66 (<.001)	-.38 (<.001)	.17 (.005)	1.00 (N/A)	.14 (.016)
7-Comparable wage index	-.20 (.002)	-.08 (.124)	-.01 (.452)	.12 (.032)	.27 (<.001)	.14 (.016)	1.00 (N/A)

Note. $N = 229$. Correlation coefficients in bold font represent correlations with fall to fall undergraduate student retention. Statistical significance for each correlation is listed under the coefficient in parentheses. The independent variable average undergraduate age represents a very strong association effect size to the dependent variable according to Davis (1971). The male undergraduate student enrollment ratio represents a substantial association to the variable full-time instructional male faculty ratio. The variables average undergraduate student age and male undergraduate student enrollment ratio represent a moderate association to each other. The variables average undergraduate student age and full-time instructional male faculty ratio represent a moderate association to each other. All of the other independent variables represent a low association effect size to the other independent variables. (Davis, 1971)

^aDependent variable: Fall-to-Fall Retention Rates of First-Time Full-Time Undergraduate Students

All 5 non-financial independent variables were forced into the forward regression analysis model and included the independent variables of total number of undergraduate students, average undergraduate student age, ratio of full time instructional faculty to all employees, full time male instructional faculty, and undergraduate male student enrollment. The only financial independent variable previously identified as statistically correlated to the dependent variable, comparable wage index, was also entered into the statistical software after the previous variables were forced into the study.

Multicollinearity was also investigated and no collinearity problems were evident in the data analysis (see Table 19). Hair et al. (2006) cites two of the most common measurements for analyzing multiple variable collinearity as tolerance and the variance inflation factor. None of the observed tolerance values are lower than .19. Hair et al. (2006) indicated, “The presence of high correlations (generally, .90 and above) is the first indication of substantial collinearity” (p. 227). In addition, Hair et al. (2006) stated

The two most common measures for assessing both pairwise and multiple variable collinearity are tolerance and its inverse, the variance inflation factor...Moreover, a multiple correlation of .9 between one independent variable and all others...would result in a tolerance value below .19 (or above a VIF of 5.3) would have a correlation of more than .90.” (Hair et al., 2006, pp. 227, 230)

None of the variables had a VIF of 5.3 or greater. (see Table 19).

The effect size for R^2 was analyzed using Cohen’s (Cohen, 1988) descriptors for the R^2 coefficient as indicated below:

.0196 to .1299: Small effect size

.1300 to .2599: Medium effect size

.2600 or larger: Large effect size

The results of the multiple regression analysis are presented in Table 19. A financial variable was included in the model if it contributed 1% or more of the explained variance. The

non-financial independent variables were forced into the model to control for the variance in the non-financial variables. These non-financial variables included total number of undergraduate students, average undergraduate student age, ratio of full time instructional faculty to all employees, percentage of full time male instructional faculty, and percentage of undergraduate male student enrollment. Considered alone, these non-financial independent variables explained 61% of the variance in the fall-to-fall student retention rates of first-time, full-time freshmen in the southern United States. The additional financial independent variable, comparable wage index, explained an additional 1% of the variance in the student retention rate model. These six variables combined to explain 63% of the variance in student retention rates and is considered statistically significant (see Table 19).

The effect size of $R^2 = .61$ for the combined five non-financial independent variables represents a large effect size. As the average undergraduate student age and total number of undergraduate students decreases, the student retention rate of first-time, full-time freshmen in public four-year universities increases. As the ratio of full time instructional male faculty, undergraduate male student enrollment, and the ratio of full time instructional faculty to all employees increases, the student retention rate increases. The effect size of $R^2 = .63$ for the combined non-financial independent variables above and the financial independent variable combined wage index also represents a large effect size. As the regional comparable wage index (CWI) decreases (see Table 18) indicating a higher adjusted wage, the student retention rate increases. However, the effect size increase is not a practically important increase over the previous explanatory variable combination again reflecting the negligible effect size of this additional explanatory variable (CWI) on student retention rates. Since all variables entered into the model, the regression analysis does not include an excluded variables section (see Table 19).

Table 19. Forward Regression Analysis Model Explaining Variance in Student Retention Rates and the Significantly Correlated Potential Explanatory Financial Characteristics after Controlling for the Significantly Correlated Non-Financial Characteristics of Four-Year Public Universities in the Southern United States, Fall 2009.

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	4,363.72	6	727.29	61.67	<.001
Residual	2,617.97	222	11.79		
Total	6,981.69	228			

Explanatory variables in model	Change statistics						
	<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	<i>SE</i>	<i>R</i> ² change	<i>F</i> change	<i>p</i> of <i>F</i> change
Non-financial ^a	.78	.61	.60	3.49	.61	70.28	<.001
Financial ^b	.79	.63	.62	3.43	.01	7.84	.006

Coefficients	Beta	Tolerance	VIF
Non-financial ^a :			
Undergrad students Total	-.30	.88	1.13
Male student enrollment %	.06	.53	1.91
Average student age	-.70	.69	1.45
Full time faculty %	-.03	.70	1.44
Male faculty %	.02	.51	1.95
Financial ^b :			
Comparable wage index	-.13	.84	1.19

Note. *N* = 229. Dependent variable: Fall-to-fall undergraduate student retention rates of first-time, full-time freshmen. The non-financial variables included in the forward regression model represent a large effect size while the comparable wage index contribution represents a negligible effect size according to Cohen (1988). Only those variables that were significantly correlated to student retention rates as shown in Table 18 were entered into the forward multiple regression model.

^aNon financial independent variables include total number of undergraduate students, undergraduate student enrollment by gender: male, average undergraduate student age, ratio of full time instructional faculty as a percentage of all employees, full time instructional faculty by gender: male. ^bComparable wage index ratio.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

Summary of Purpose and Specific Objectives

The purpose of this study was to determine if a model exists that allocates faculty salary outlays in a manner that increases freshman retention for public four-year universities in the 16 states of the Southern Region Education Board (SREB). The dependent variable for this study was the fall-to-fall retention rate for first-time bachelor's or equivalent degree-seeking undergraduate students.

This study used the following objectives to guide the data analysis and research:

1. Describe the following financial characteristics as related to faculty salaries for public four-year SREB universities:
 - Average salary outlays of full-time instructional faculty
 - Average fringe benefits outlays of full-time instructional faculty
 - Instructional expenses as a percent of total core expenses
 - Proportion of university expenses paid by financial aid
 - The total amount of core institutional expenditures
 - Comparable wage index
2. Describe the following selected non-financial characteristics of public four-year SREB universities:
 - Student retention rates of first-time bachelor's or equivalent degree-seeking undergraduate full-time students, fall-to-fall
 - The total number of undergraduate students enrolled in the institution
 - The number of full-time equivalent undergraduate students

- The percentage of total undergraduate student enrollment in each of the following ethnic groups: White non-Hispanic, Black non-Hispanic, Hispanic, Asian or Pacific Islander, and American Indian or Alaska Native
 - The percentage of total student enrollment by gender
 - The average undergraduate student age at institution
 - The percentage of full-time instructional faculty
 - The percentage of full-time instructional faculty by gender
 - The percentage of full-time instructional faculty in each of the following ethnic groups: White non-Hispanic, Black non-Hispanic, Hispanic, Asian or Pacific Islander, and American Indian or Alaska Native
 - The percentage of full-time instructional faculty by academic rank as follows: Professor, associate professor, assistant professor, instructor, and lecturer
 - The percentage of full-time instructional faculty by tenure status as follows: tenured, tenure-track, and non-tenured
 - The percentage of full-time instructional faculty by contract length as follows: 9/10 month contract or 11/12 month contract
3. Determine if a relationship exists between student retention rates and the financial and non-financial characteristics of SREB universities.
 4. Determine if the financial characteristics of SREB universities explain a practically important proportion of the variance in student retention rates.
 5. Determine if the financial characteristics of SREB universities explain a practically important proportion of the variance in student retention rates, after controlling for the non-financial characteristics of the institution.

Population

The study defines its target population as public four-year universities located in the 16 states in the Southern Regional Education Board (SREB) domain. The data for the population in this study is wholly accessible in the Integrated Postsecondary Education Data System (IPEDS) authorized by the Higher Education Act of 1992 as the official database requiring accurate reporting by participating institutions via a survey tool.

In particular, the study defines the institutions accredited by the Southern Region Education Board (SREB) in the 16 member states with information that participate in Federal financial aid programs requiring accurate reporting to the U.S Department of Education's (DOE) Integrated Postsecondary Education Data System (IPEDS) database. This study found 240 post-secondary institutions met the criteria.

Methodology

Based on the review of literature and theoretical framework, this study selected specific independent variables of financial characteristics and additional non-financial institutional characteristics to include in the data analysis. The permission to complete this study was received from the Louisiana State University's Institutional Review Board (IRB).

The data for this study was retrieved from information reported to the Integrated Postsecondary Education Data System (IPEDS) for the study's dependent variable and independent variables. This study queried information for the year 2009 for all public four-year universities located in the 16 states of the SREB.

For the financial characteristics variables addressed in objective one, descriptive statistics were used to reveal the count for each variable, maximum value, minimum value, standard deviation, skewness, and number of outliers. This information is required in order to investigate

missing data, outliers, normality, and linearity issues or the variables before performing a multiple regression analysis (Tabachnick & Fidell, 2007, p. 117).

For the non-financial characteristics addressed in objective two and the dependent variable student retention, descriptive statistics were used to reveal the count, maximum value, minimum value, standard deviation, skewness, and number of outliers. This information is required in order to investigate missing data, outliers, normality, and linearity issues or the variables before performing a multiple regression analysis.

Objective three explored the relationship between the dependent variable student retention and the independent variables in the study. Pearson product-moment correlation coefficients were used to measure the relationships. The effect sizes for the correlations were interpreted according to Davis (1971). Correlation statistics describes the relationship between two variables but does not determine causation (Gravetter & Wallnau, 2011).

Objective four sought to create a regression model to indicate the proper percentage allocation of financial characteristics to increase student retention for institutions in the target population. In addition, the effect size for the resulting model was evaluated.

Objective five sought to create a regression model that would indicate the proper percentage allocation of financial institutional characteristics after controlling for additional non-financial characteristics to increase student retention for the target population. In addition, the effect size for the resulting model was evaluated.

Summary of Major Findings

Objective One Results

In 2009, public four-year universities in the 16 SREB states allocated an average \$32.8 million in instructional faculty salaries and an additional \$8.8 million in related fringe benefits out of an average \$224.9 million total institutional expenditures. Of this total, 43.94% was

expended on instructional expenditures. The 240 institutions averaged 14.09% of total expenditures paid through financial aid funding (federal, state, and local). The comparable wage index for all 16 states averaged .01 divided into three regional indices with the higher index indicating lower normalized wages and lower student retention rates.

It appears that the large salary outlays of some schools combined with the influence of the very small salary outlays of some other schools in the 16 states of the SREB resulted in the standard deviation of almost 39 million dollars with a mean of almost 33 million dollars. The large fringe benefit outlays of some schools combined with the influence of the very small fringe benefit outlays of some schools in the 16 states of the SREB also resulted in the standard deviation greater than the mean.

Objective Two Results

Objective two results found that public four-year universities in an SREB state in 2009 had an average fall-to-fall first-time full-time freshmen student retention rate of 17.04%. In addition, the average enrollment of undergraduate students was about 10,621 with full time equivalent students averaging about 8,982. Of the undergraduate student body, ethnicity averaged as follows in descending order: white 54.63%, black 23.72%, Hispanic 12.55%, Asian 3.30%, American Indian .72%. Further demographic details reported female undergraduate enrollment averaged 56.79% and the average student age was 23.56.

The results for objective two also found that 88.06% of faculty serve 9 or 10 month contract lengths, and 71.05% of full time instructional faculty are tenured or on tenure track. The difference in gender is 10.84% more male faculty than female faculty and 13.58% more undergraduate female student enrollment than males.

Additional results found the ratio of full time instructional faculty as a percentage of all employees to be 26.09%. Of this ratio, male faculty was 55.42% and ethnicity averaged in

descending order as follows: white 72.41%, black 11.99%, Asian 6.61%, Hispanic 4.30%, and American Indian .64%. There was a large percentage of missing race or ethnicity data for student ratios or faculty ratios decreasing the ability to use this variable as a predictor of student retention rates.

The percentage of full time instructional faculty by academic rank in 2009 indicated the following averages of the full time instructional faculty in descending order: assistant professors 30.21%, associate professors 24.14%, professors 23.57%, instructors 12.81%, and lecturers 5.51%. Of the 240 institutions, 60 cases, or 25.00%, reported less than 100% in the five ranks measured in this variable indicating the presence of other academic ranks of full-time instructional faculty not gathered by IPEDS data.

Distribution of full time instructional faculty by tenure averaged 44.23% tenured, an average 28.95% not on tenure track or at institutions with no tenure system, and an average 26.82% on tenure track. The percentage of this faculty on 9 or 10 month contract averaged 88.06%.

Objective Three Results

Objective three results indicate a relationship exists between the dependent variable of undergraduate student retention rates and some of the financial and non-financial variables. The results for the financial independent variables, comparable wage index, resulted in a correlation coefficient of minus .21 indicating the variable was inversely related to student retention rates, however, the effect size indicates a low association between the two variables. The finding that the other financial variables are not correlated to student retention rates was surprising since the literature indicates a relationship exists in other studies between expenditures and cohort graduation rates (Ryan, 2004).

Seven of the non-financial independent variables resulted in a correlation coefficient indicating practical significance with the dependent variable. The average age of the undergraduate student indicated a high correlation with the dependent variable of fall-to-fall retention rates of first-time full-time undergraduate students and a strong association effect size. Only undergraduate student Hispanic percentages and undergraduate student enrollment by gender indicated a correlation of practical significance with an effects size of moderate association.

The correlations for the other non-financial independent variable data revealed the following correlations initially signifying relationships but, upon further examination, the effect size is low. The total number of undergraduate students are inversely related to student retention rates. The ratio of full-time instructional faculty to all employees is positively related. The percentage of male full time instructional faculty is positively related to student retention rates. The percentage of Hispanic full time instructional faculty are inversely related but a low effect size exists.

Objective Four Results

The results of this study found a model that meets the minimum effect size necessary to predict the fall-to-fall first-time undergraduate student retention rate at four-year public universities in the southern United States using the financial institutional characteristics regional comparable wage index. The results show the model's R^2 of .04 is above .0196, the minimum criteria to meet the classification of "small effect size" (Cohen, 1988) but below the minimum criteria of .1300 for a medium effect size. Multicollinearity was also examined and found not to exist. The variable comparable wage index entered into the forward multiple regression analysis explained only four percent of the variance ($R^2 = .04$, $p < .003$) in undergraduate student retention rates ($F = 8.96$, $p = .003$) in public four-year universities in the southern United States.

The financial variables related to faculty salaries selected from the review of the literature did not explain the variance in student retention rates with the exception of the comparable wage index. As comparable wages increased, student retention rates increased.

Objective Five Results

Objective five results found a model that meets the minimum effect size necessary to predict the fall-to-fall first-time undergraduate student retention rate at four-year public universities in the southern United States in 2009 using the significantly correlated financial institutional characteristic comparable wage index in objective four after controlling for the non-financial institutional characteristic. These non-financial characteristics are total number of undergraduate students, average undergraduate student age, ratio of full time instructional faculty to all employees, percentage of full time male instructional faculty, and percentage of undergraduate male student enrollment. These institutional characteristics explained 61.2% of the variance in the fall-to-fall student retention rates of first-time, full-time freshmen in the southern United States. The additional financial independent variable, comparable wage index, explained an addition 1.3% of the variance in the student retention rate model with the combined variables explaining 62.5% of the variance.

The regression correlations found the independent variable average undergraduate age represents a very strong association effect size to the dependent variable student retention rates. The male undergraduate student enrollment ratio represents a substantial association to the variable full-time instructional male faculty ratio. Moderate associations were found between the independent variables average undergraduate student age and male undergraduate student enrollment ratio and between average undergraduate student age and full-time instructional male faculty ratio.

As the average undergraduate student age and total number of undergraduate students decreases, the retention rate of first-time, full-time freshmen students in public four-year universities in the southern United States increases. As the ratio of full time instructional male faculty, undergraduate male student enrollment, and the ratio of full time instructional faculty to all employees increases, the retention rate increases. As the regional comparable wage index decreases resulting in higher comparable wages, the student retention rate increases slightly further.

Conclusions, Implications, and Recommendations

Conclusion One

It was concluded that regionally accredited public four-year universities in the Southern United States spend less than the national average per full time equivalent student. In addition, total core institutional expenditures per full time equivalent (FTE) student in the Southern United States in Fall, 2009, averaged \$25,048. These results are consistent with data reported by the National Center for Education Statistics (2010) for all postsecondary institutions in the United States. The NCES reported average total institutional expenditure per full time equivalent student was \$27,315 at public degree granting colleges (Knapp et al., 2010) and \$36,707 at all public four-year universities. This conclusion is based on objective one financial characteristic results, specifically total amount spent on core institutional expenses, and objective two selected non-financial institutional characteristic results, specifically number of full time equivalent undergraduate students.

This information is of value to administrators of public four-year universities in the Southern United States for information regarding financial ratios to investigate how their particular institution compares to the southern norm and the national norm. This information can be used to set strategic goals to increase or decrease core institutional expenditures per student

FTE to reach these norms. Administrators who understand how much their expenditures differ from the norms have the information to research and explain departures from the norm to college stakeholders.

The results of this study are averages from unweighted data. Very large public four-year universities have the same value in calculating the mean as a very small public four-year institution in the SREB. A recommendation for future research is to consider using weighted averages.

Conclusion Two

It was concluded that the ethnicity of students and faculty from IPEDS cannot be used to determine the relationship between student retention rates and faculty salary for fall, 2009, since a large percentage of race and ethnicity of students and faculty are unknown. This conclusion came from an examination of the data revealing that race or ethnicity was not reported for 32.08% of faculty and student race or ethnicity was not reported for 42.50% of the students in the data for the 240 institutions in the study. Further examination of the data reported for objective two verified the data was correctly retrieved from IPEDS database and the data ratios are correct.

These results differ from other studies that use ethnicity in reporting data. Radford et al. (2010) ranked student attainment and retention at first institution by race/ethnicity for the cohort 2004-2009. Lotkowski et al. (2004) reported four-year college enrollment for all postsecondary institutions for 1999-2000 and examined the six-year cohort. Lotkowski et al. (2004) report on student ethnicity as an important non-academic factor in college retention.

This information is of value to administrators of public four-year universities in the Southern United States because IPEDS data is widely used for benchmark comparison purposes. When comparing an institution to a peer institution, administrators should check to see if the

chosen peer institution has included the desired comparison data before setting the institutional benchmarks.

A recommendation for future research is to survey institutions for the missing ethnicity data. If the data is not obtained, further studies of student retention to faculty salaries should exclude ethnicity of faculty or student ratios unless 15% or fewer cases are missing data (Mertler & Vannatta, 2005).

Conclusion Three

It was concluded that student retention rates of first-time full-time freshmen in public universities in the Southern United States are related to some of the selected financial and non-financial characteristics associated with their institutions with various effect size of the relationships. In addition, only one financial independent variable, comparable wage index, was related but had a low inverse association to student retention rates. As normalized wages increased, student retention rates increased slightly. Comparable wage indexes across the region averaged .01% and did not influence expenditures.

The allocation of full time instructional faculty salaries and benefits, amounts spent on instruction or core expenditures, or proportion of financial aid revenue are not related to increased or decreased student retention rates. The non-financial characteristics of average undergraduate student age, undergraduate student Hispanic ethnicity and gender, total number of undergraduate students, full time instructional faculty ratio to all employees, and full time instructional faculty by gender and Hispanic ethnicity were related to the dependent variable of first-time, full time freshmen retention rates.

A review of the literature indicated that “no comparable national rate exists” (Collins, 2010, p. 9). Although Aud et al. (2011) reported the national retention rates by institutional control, the data is divided by institutional admissions application criteria. Radford et al. (2010)

reported retention based on the student's perspective and in the context of six-year attainment and retention rates at a student's first institution.

These results differ from the results of Gansemer-Topf and Schuh (2006) which indicated moderate correlation in instructional and academic support expenditures and student retention rates for selective admission private four-year colleges (Burton, 2011). The results are consistent with a recent community college study by Burton (2011) finding no relationship between the financial allocations by functional area and student retention rates. The results of this study differ from Ryan's (2004) research indicating expenditures in certain cost functions impact cohort graduation rates.

This information is of value to administrators of public four-year universities in the Southern United States for information regarding Integrated Postsecondary Education Data System (IPEDS) ratios to investigate how their particular institution compares to the southern norm and the national norm. This information can be used to set institutional goals in order to reach the favorable norms. Administrators who understand how much their institutional statistics differ from the norms have the information to research and explain departures from the norm to college stakeholders and to offer strategies to reach these norms.

A recommendation for future research is to determine if different financial descriptors correlate to freshmen retention for public four-year universities in the Southern United States. Further studies could separate total expenditures per FTE into high, average, and low expenditure categories. Expenditure data in other functional areas of student support, academic support, and institutional support could be stratified to determine any relationships to freshmen retention.

Conclusion Four

It was concluded that a predictive regression model exists utilizing the regional comparable wage index with an appropriate, but small, effect size to suggest this financial institutional characteristic can predict freshmen retention rates in public four-year universities in the Southern United States. In addition, the financial variables of salary and fringe benefit outlays of full time instructional faculty, instructional expenses as a percent of total core expenses, and total amount spent on core institutional expenses do not create a predictive model for four-year public SREB universities' first time full time freshmen retention rates.

The results of this study differ from other studies which produced models utilizing allocation of financial resources to instructional spending, academic support, and student services. Ryan (2004) found increased instructional and academic support expenses had a positive effect on graduation rates for the cohort he studied. Smart et al. (2002) and Astin (1993) found an institution's expenses related to student support services had a positive effect on student involvement. Gansemer-Topf and Schuh (2006) found financial allocation and institutional selectivity models for retention and graduation rates at private four-year universities and colleges.

This information is of value to administrators of public four-year universities in the Southern United States for information regarding financial and non-financial numbers and ratios to investigate how their particular institution compares to the southern norm and the national norm. This information can be used to assess performance and set strategic goals to change institutional financial or non-financial characteristics to reach these norms. Administrators who understand how much their financial and non-financial institutional characteristics differ from the norms have the information to research and explain departures from the norm to college stakeholders.

A recommendation for further research could separate institutions by high, average, and low total core institutional expenditures. Another study could request all institutions provide faculty and student ethnicity or race.

Conclusion Five

It was concluded that some non-financial characteristics can be used to predict the retention rates of first-time, full-time freshmen. In addition, these characteristics include total number of undergraduate students, average undergraduate student age, ratio of full time instructional faculty to all employees, percentage of full time male instructional faculty, and percentage of undergraduate male student enrollment combined. In addition, one financial characteristic, comparable wage index, can be added to refine this prediction slightly.

In addition, average undergraduate age represents a very strong association effect size to the dependent variable student retention rates. A review of the literature did not find reports of the average age of undergraduate students. Marks' (2009) SREB Fact Book on Higher Education reported actual 1998 and 2008 age distribution of the population and projected 2020 and 2030 population age distributions. Radford et al. (2010) reported attainment and retention at first institution by spring 2009 by age when first enrolled in 2003-2004. Collins (2010) reported percent of adults ages 25 and older with a bachelor's degree of higher in 2008. Snyder and Dillow (2011) reported percentage distribution of enrollment and completion status of first-time postsecondary students starting during the 1995-1996 academic year by age when first enrolled.

Summary

The results of this study found a model exists utilizing the regional comparable wage index to suggest this variable may predict first-time, full-time freshmen retention rates in public four-year universities in the Southern United States. As the region's comparable wages increase, the student retention rates increase. The other financial variables related to faculty salaries of

salary and fringe benefit outlays of full time instructional faculty, instructional expenses as a percent of total core expenses, and total amount spent on core institutional expenses did not create a predictive model for four-year public SREB universities' first time full time freshmen retention rates.

The results of this study found a model exists explaining variance in student retention rates and the non-financial characteristics of total number of undergraduate students, average undergraduate student age, ratio of full time instructional faculty to all employees, percentage of full time male instructional faculty, and percentage of undergraduate male student enrollment combined. In addition, the average undergraduate age represents a very strong association effect size to the dependent variable student retention rates. As the total number of undergraduate student and average undergraduate student age decreases, the student retention rate increases. As the percentage of full time instructional faculty and male faculty and student enrollment increases, the student retention rate increases. One financial characteristic, comparable wage index identified in the study, can be added to refine this variation explanation slightly. As the regional comparable wage increases, student retention rates increase.

The practitioner can expect to find that higher regional wages, lower undergraduate student age, and lower total undergraduate student enrollment will indicate a higher student retention rate. The practitioner can also expect to find, in the southern United States, that the full time instructional faculty ratio to all employees increases along with retention rates. In addition, the practitioner can expect that increased percentages of male full time instructional faculty and male undergraduate student enrollment increase along with student retention rates.

Excluded variables included undergraduate student enrollment by ethnicity and the full time instructional faculty by ethnicity due to missing data. However, the review of literature

indicates student and faculty ethnicity plays an important role in student retention rates, therefore, the model should not be used to improve student retention rates in public four-year universities in the southern United States since this important data is excluded.

This study begins with a story about a university administrator trying to find a reason to justify increasing faculty salaries to improve student retention rates. A review of the literature indicates most institutional financial characteristics associated with faculty salaries do not explain retention rates in first-time, full-time freshmen. One financial institutional characteristic, regional comparable wage index, and several non-financial institutional characteristics appear to influence student retention rates and faculty salaries. The data reviewed in this study supports a strong relationship between higher retention rates of first-time, full-time freshmen students and lower average undergraduate student age, lower total number of undergraduate students, lower ratio of full time instructional faculty to all employees, higher percentage of full time male instructional faculty, and higher percentage of undergraduate male student enrollment combined.

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**APPENDIX A: REFERENCES ADDRESSING RELATIONSHIPS BETWEEN THE DEPENDENT VARIABLES AND
SELECTED CHARACTERISTICS OF UNDERGRADUATE INSTITUTIONS**

Reference	Student retention	Number of students	FTE ^a	Student ethnicity	Student gender	Average student age	Number of faculty	Faculty gender	Faculty ethnicity	Faculty tenure status
Astin, 1984	X			X	X					
Astin, 1993	X	X	X		X	X				
Aud et al., 2011	X	X	X	X		X				
Bean, 1980	X									
Bean, 1990	X									
Boudreau et al., 1997								X		
Bradburn & Sikora, 2002							X	X	X	X
Card & Kreuger, 1996	X			X						
Cataldi, Bradburn & Fahimi, 2005							X	X	X	X
Hanushek, 1997	X	X								
Knapp, Kelly-Reid & Ginder, 2010							X	X	X	X
Lotkowski, Robbins & Noeth, 2004	X	X		X						
Monk, 1992										
NCES, 2002		X	X			X		X		
NCES, 2004							X	X	X	X
Pascarella & Terenzini, 1991	X									
Pascarella & Terenzini, 1979	X									
Pike et al., 2006	X									
Radford et al., 2010	X	X	X	X	X	X				
Ryan, 2004	X	X								
Smart, et al., 2002										
Snyder & Dillow, 2011	X	X	X				X	X		X
Spady, 1971	X									

(con'd)

(Appendix A, continued)

Reference	Student retention	Number of students	FTE ^a	Student ethnicity	Student gender	Average student age	Number of faculty	Faculty gender	Faculty ethnicity	Faculty tenure status
Strach, 2009										
Tinto, 1975	X			X	X					
Tinto, 1982	X									
Tinto, 2006	X									
Toutkoushian, 1998								X		X
Toutkoushian, 1999		X	X							
Umbach & Wawrzynski, 2005	X	X		X	X	X	X	X	X	
(con'd)										

Reference	Faculty academic rank	Faculty teaching field	Faculty contract length	Faculty inter-action	Faculty salaries	Faculty Benefits	Instruc-tional expenses	Acad-emic support expenses	Institu-tional expenses	Financial Aid	COL or CWI _b	Under-graduate tuition
Astin, 1984				X			X		X			
Astin, 1993				X								
Aud et al., 2011	X			X	X	X			X			
Bean, 1980							X		X			
Bean, 1990												
Boudreau et al., 1997	X			X	X							
Bradburn & Sikora, 2002	X	X	X		X							
Card & Kreuger, 1996							X		X			
Cataldi, Bradburn & Fahimi, 2005	X	X		X								
Hanushek, 1997									X			
Knapp, Kelly-Reid & Ginder, 2010	X		X	X	X							
Lotkowski, Robbins & Noeth, 2004										X		

(con'd)

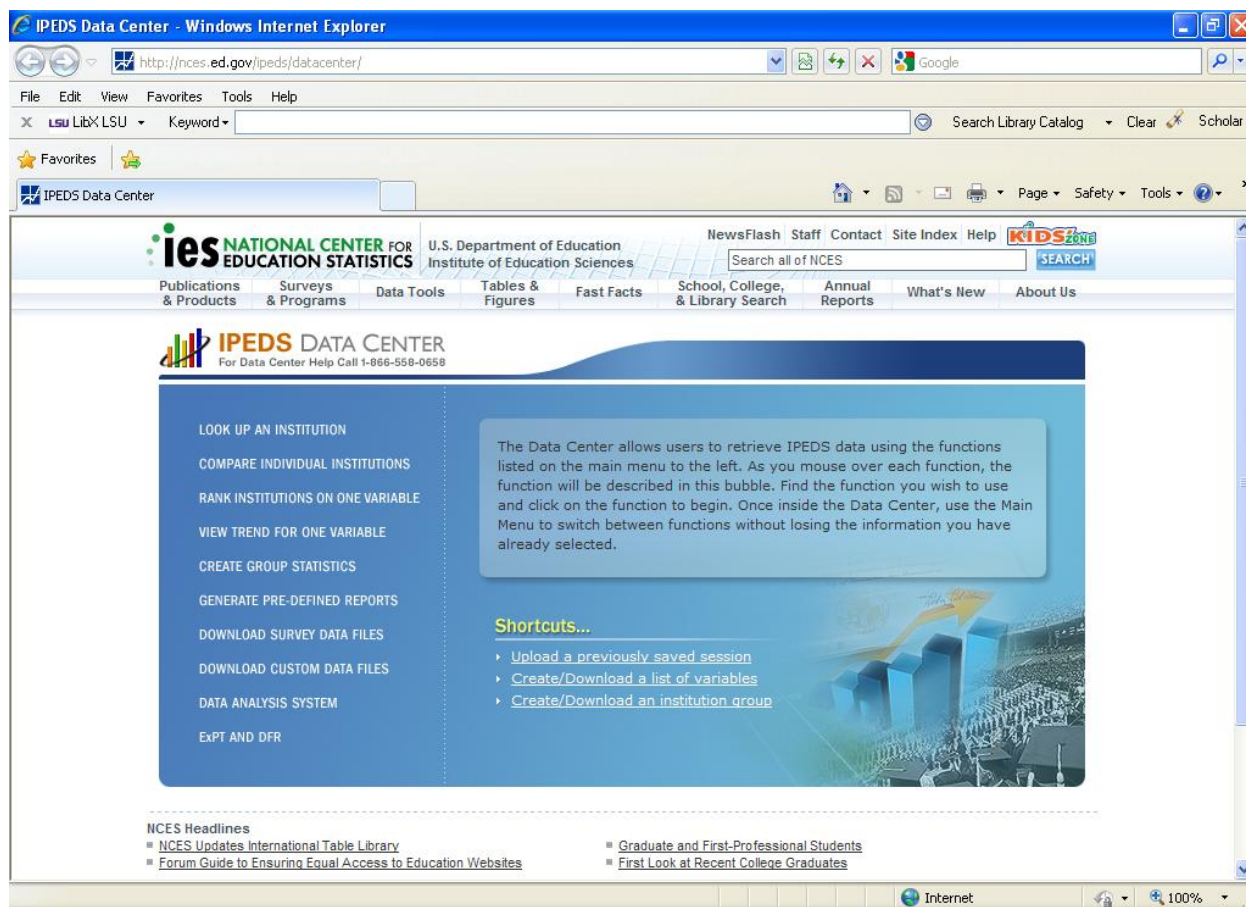
(Appendix A, continued)

Reference	Faculty academic rank	Faculty teaching field	Faculty contract length	Faculty inter- action	Faculty salaries	Faculty Benefits	Instruc- tional expenses	Acad- emic support expenses	Institu- tional expenses	Financial Aid	COL or CWI _b	Under- graduate tuition
Monk, 1992												
NCES, 2002					X				X		X	X
NCES, 2004	X	X	X		X	X						
Pascarella & Terenzini, 1991												
Pascarella & Terenzini, 1979												
Pike et al., 2006							X	X	X	X		
Radford et al., 2010												
Ryan, 2004							X	X	X			
Smart et al., 2002							X		X			
Snyder & Dillow, 2011				X			X		X			X
Spady, 1971												
Strach, 2009												X
Tinto, 1975												
Tinto, 1982				X								X
Tinto, 2006				X					X			
Toutkoushian, 1998	X											
Toutkoushian, 1999	X			X	X							
Umbach & Wawrzynski, 2005	X	X		X	X		X		X			

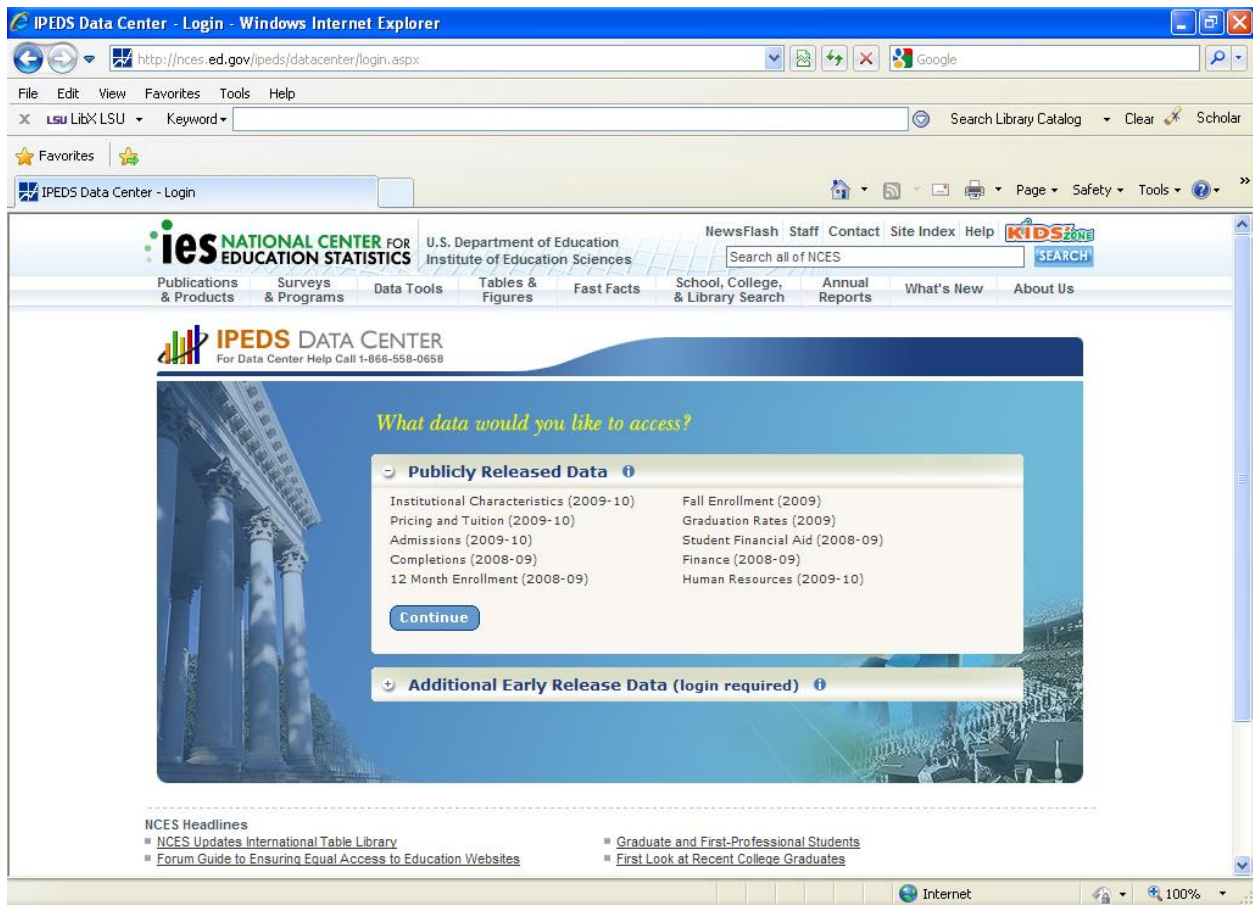
^aFTE = full-time equivalent students. ^bCOL = cost of living, CWI = comparable wage index.

APPENDIX B: DATA COLLECTION QUERY FORMS

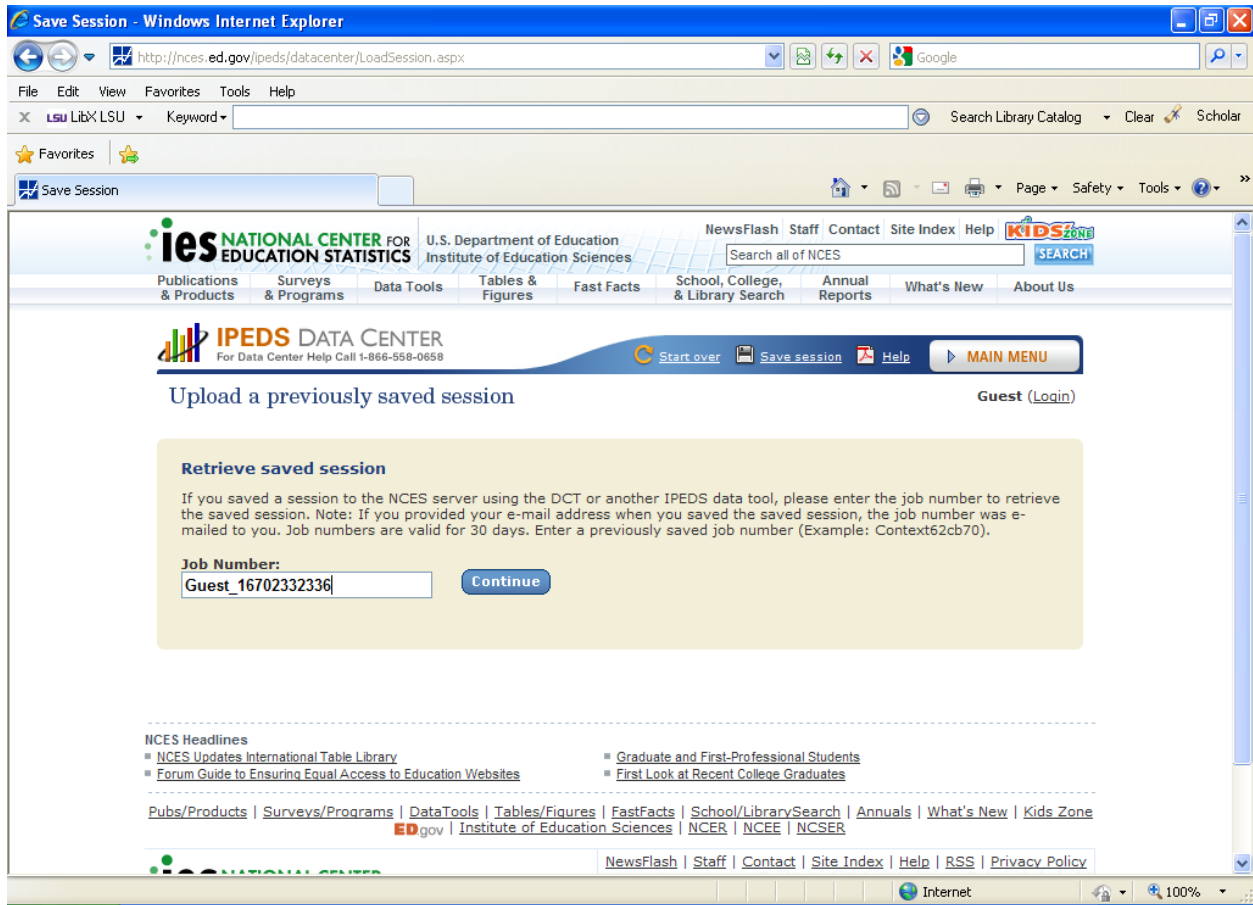
Go to the website: <http://nces.ed.gov/ipeds/datacenter/>



Select “upload a previously saved session.”

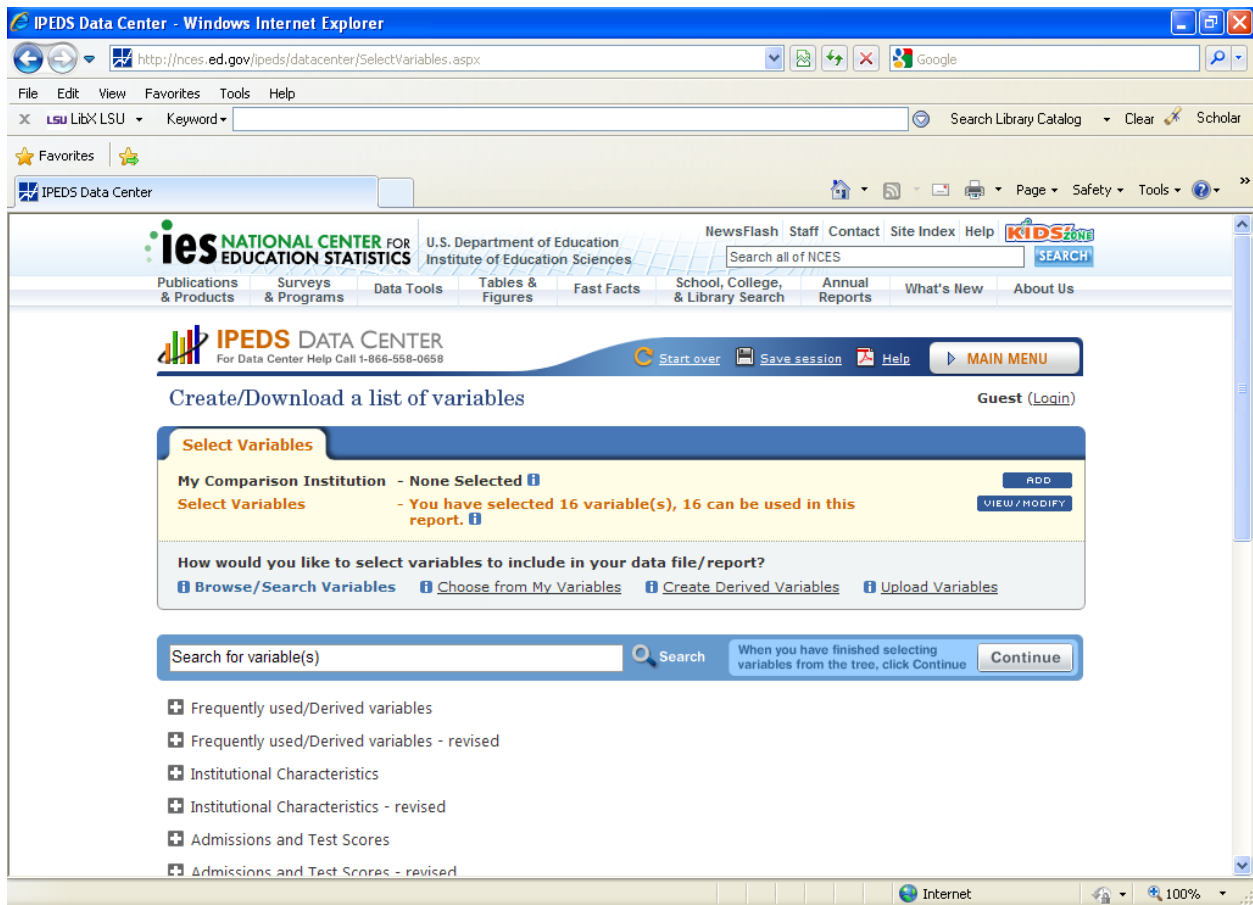


Select “continue.”



In the space marked “Job Number, enter “Guest_16702332336” and select “continue.”

This should return institutions and variables.



Select “download” and the “CSV.” Save the data to the desired location in the compressed format. To access it for analysis, uncompress the data, and use a spreadsheet program.

APPENDIX C: CERTIFICATE OF COURSE COMPLETION: PROTECTING HUMAN RESEARCH PARTICIPANTS



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Belinda Aaron** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 07/19/2011

Certification Number: 718995



APPENDIX D: LOUISIANA STATE UNIVERSITY INSTITUTIONAL REVIEW BOARD APPROVAL

Application for Exemption from Institutional Oversight

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/ projects using living humans as subjects, or samples, or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.

— Applicant, Please fill out the application in its entirety and include the completed application as well as parts A-E, listed below, when submitting to the IRB. Once the application is completed, please submit two copies of the completed application to the IRB Office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at <http://research.lsu.edu/CompliancePoliciesProcedures/InstitutionalReviewBoard%28IRB%29/item24737.html>

— A Complete Application Includes All of the Following:

(A) Two copies of this completed form and two copies of part B thru E.

(B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1&2)

(C) Copies of all instruments to be used.

*If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.

(D) The consent form that you will use in the study (see part 3 for more information.)

(E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB. Training link: (<http://phrp.nihtraining.com/users/login.php>)

(F) IRB Security of Data Agreement: (<http://research.lsu.edu/files/item26774.pdf>)



Institutional Review Board
Dr. Robert Mathews, Chair
131 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.6792
irb@lsu.edu
lsu.edu/irb

1) Principal Investigator: Belinda P. Aaron

Rank: Graduate Student

Dept: Human Resource Education

Ph: 318-473-6515

E-mail: baaron2@lsu.edu

2) Co Investigator(s): please include department, rank, phone and e-mail for each
*If student, please identify and name supervising professor in this space

Supervising professor: Dr. Joe W. Kotlik, College of Agriculture, School of Human Resource Education and Workforce Development, J.C. Atherton Alumni Professor, 225-578-5743, kotlik@lsu.edu

IRB# E5913 LSU Proposal #

☒ Complete Application

☒ Human Subjects Training

3) Project Title:

The Relationship of Faculty Salaries Outlays to Student Retention in Public Four-Year Universities in the Sixteen States of the Southern Region Education Board

Study Exempted By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 | www.lsu.edu/irb

4) Proposal? (yes or no) ☐ No

If Yes, LSU Proposal Number

Also, if YES, either

☐ This application completely matches the scope of work in the grant

OR

☐ More IRB Applications will be filed later

5) Subject pool (e.g. Psychology students)

Public Universities in the 16 Southern Region Education Board states

*Circle any "vulnerable populations" to be used: (children <18; the mentally impaired, pregnant women, the ages, other). Projects with incarcerated persons cannot be exempted.

6) PI Signature

Belinda P. Aaron

Date

March 10, 2012

(no per signatures)

** I certify my responses are accurate and complete. If the project scope or design is later changes, I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Screening Committee Action: Exempted ☒ Not Exempted ☐ Category/Paragraph 4

Reviewer

Mathews

Signature

Robert C. Mathews

Date

3/21/12

APPENDIX E: INTEGRATED POSTSECONDARY EDUCATION DATA SYSTEM SURVEY FORM SAMPLE

https://surveys.nces.ed.gov/IPEDS/Downloads/Forms/package_12_94.pdf - Windows Internet Explorer

https://surveys.nces.ed.gov/IPEDS/Downloads/Forms/pa

File Edit Go To Favorites Help

★ Favorites https://surveys.nces.ed.gov/IPEDS/Downloads/Form...

1 / 20 77.5% Find

NCES National Center for Education Statistics IPEDS Help Desk 1.877.225.2568

Integrated Postsecondary Education Data System 2012-13

2012-13 Survey Materials > Form date: 8/8/2012

IC Header for 4-yr institutions

Part A - Educational Offerings

1. Which of the following types of instruction/programs are offered by your institution? [Check one or more]

If your institution does not offer occupational, academic or continuing professional programs, you are not expected to complete this or any other IPEDS survey.

<input type="checkbox"/>	<u>Occupational, may lead to a certificate, degree, or other formal award</u>
<input type="checkbox"/>	<u>Academic, leading to a certificate, degree, or diploma</u>
<input type="checkbox"/>	<u>Continuing professional</u> (postbaccalaureate only)
<input type="checkbox"/>	Recreational or <u>avocational</u> (leisure) programs
<input type="checkbox"/>	<u>Adult basic</u> or remedial instruction or high school equivalency
<input type="checkbox"/>	Secondary (high school)

Done Unknown Zone

VITA

Belinda Powell Aaron serves as the Assistant Vice Chancellor for Finance and Administrative Services at Louisiana State University at Alexandria (LSUA). She began at LSUA in 2003 as Director of Budget, Risk Management, and Safety. She also serves as an adjunct instructor in LSUA's College of Professional Studies' Department of Business Administration teaching undergraduate business administration, management, and marketing classes. Her previous experience includes healthcare and retail marketing and management. Her background includes a Master's degree in Business Administration.