EXAMINING THE RELATIONSHIP BETWEEN STUDENT BODY RACIAL DIVERSITY AND COLLEGE/UNIVERSITY RETENTION AND GRADUATION RATES

By

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DEDICATION

To my family and friends who have supported me over the years

and

To Grace for everything you have done for me

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CHAPTER I

INTRODUCTION

There is substantial evidence that the completion of a college degree is an important tool for an individual's economic and social mobility in the United States. Over the working life of the average American, high school graduates earn an average of $1.2 million; associate's degree holders earn about $1.6 million; and bachelor's degree holders earn about $2.1 million (Day & Newburger, 2002). College graduates also enjoy increased job security and employment opportunities. By 2012, the number of jobs which require advanced educational skills will increase at twice the rate of those jobs requiring only basic educational skills (Hecker, 2004). Twenty-one of the 30 fastest growing occupations generally require a postsecondary degree (Hecker, 2004).

In addition to these economic benefits, college completion has also been found have several non-monetary benefits for individuals and society. College graduates have been found to be more open-minded, be more cultured, provide an improved quality of life for their offspring, make better consumer decisions, and engage in more hobbies and leisure activities (Institute for Higher Education Policy, 1998; Rowley & Hurtado, 2003). Higher educational attainment has also been found to increase an individual's likelihood of volunteering, lead to greater civic engagement and participation, and increase overall physical and mental health (Baum & Ma, 2007; Perna, 2005).

From an institutional perspective, student college completion is also very important. Contrary to the image of colleges and universities taking pride in the

infamous freshmen orientation message of "look to your right, look to your left; one of you will not be here next term," today's institutions of higher education understand the value of high retention and graduation rates (Laden, Milem, & Crowson, 2000). Graduation rates are often seen as a sign of institutional prestige. For example, the US News and World Report's *America's Best Colleges* publications use a ranking methodology in which institutional retention and graduation rates account for 20% to 25% of an institution's overall quality "score" (Morse & Flanigan, 2008). "We retain better" promotional materials are often used by colleges and universities in their recruitment of what are increasingly more "consumer savvy" students and parents (Laden, et al., 2000). Financially, colleges and universities often lose thousands of dollars each year from loss of tuition revenue, reduction in the use of campus auxiliary services, loss of institutional investment in student recruitment, and loss of alumni contributions associated with student attrition (Schuh, 2005; Seidman, 2005a; Swail, 2004). Student attrition also represents the failure of an institution of higher education to accomplish its educational mission (Bean, 1990).

Despite this information regarding the importance of college completion to both students and institutions, a substantial number of students who enter post-secondary education leave before obtaining their degree. College and university graduation rates have held constant at between 45% and 50% for over 125 years (American College Testing Program, 2006; Tinto, 1982). The consistency of these rates has been perplexing for scholars and practitioners who have spent over 80 years studying college student attrition in hopes of raising college and university graduation rates (Braxton, 2000). This vast literature attempting to better understand college student attrition can be classified

into four major motifs. The first motif focuses on the pre-college characteristics of students in an attempt to determine which of these characteristics best predicts academic performance and persistence (Astin, 1975, 1993; Feldman & Newcomb, 1969; Ishitani, 2003). This research has found that several characteristics including gender, race, SAT scores, and socioeconomic status have a significant impact on the likelihood of a student dropping out of college.

A second motif, best described as the student-institutional fit approach, views persistence decisions as primarily the end product of the interaction between a student and his/her college/university (Bean, 1980, 1982; Strauss & Volkwein, 2004; Tinto, 1987, 1993). This approach examines how a student's experiences with the academic and social realm of a college or university affects his/her likelihood of persistence (St John, Cabrera, Nora, & Asker, 2000). The findings of much of this line of research suggest that, conditional on institutional type, the stronger a student's ties to the academic and social communities of a college/university, the greater the probability that the student will remain enrolled in that college/university. A third motif highlights the impact of campus culture on college student attrition (D'Augelli & Hershberger, 1993; Hurtado & Carter, 1997; Kuh & Love, 2000; Swail, Redd, & Perna, 2003; Tierney, 1992). This line of research, which grew out of criticisms of the "dominant culture" perspective proposed by scholars working from the student-institutional fit perspective, posits student attrition is in large part a product of the fact that many students, especially Minority students, fail to engage in the "collective, mutually shaping patterns of norms, values, practices, beliefs, and assumptions that guide the behavior of individuals and groups" (Kuh & Whitt, 1997, p. 12) on a college/university campus. This lack of

engagement in the culture of an institution, along with the possible disconnect between a student's culture of origin and the culture of a college or university, is believed to contribute to student dropout.

A fourth motif which can be used to group literature on college student attrition is research examining student dropout from an organizational perspective (Astin, Korn, & Green, 1987; Berger, 2001-2002; Berger & Braxton, 1998; Gansemer-Topf & Schuh, 2006; Titus, 2004). This line of research examines the impact of institutional characteristics and behaviors such as institutional control, selectivity, location, commitment to student welfare, and mission on student persistence. While research on college student attrition from the organizational perspective has increased in recent years, there remains a general lack of attention to the impact of organizational behavior on institutional retention and graduation rates (Berger, 2000). As a result, questions still remain about how various core attributes of college and university organizations link with student attrition (Laden, et al., 2000). One such attribute that has received very little empirical investigation with regard to its association with college and university retention and graduation rates is student body racial diversity (Rendon, Jalomo, & Nora, 2000).

The lack of empirical research examining the impact of student body racial diversity on institutional retention and graduate rates is surprising given the high volume of research activity on the educational impact of racially diverse campus environments. Following the 1978 Supreme Court ruling in *Regents of the University of California v. Bakke* in which the Justice Powell argued that the legality of affirmative action in higher education admissions was in part contingent on the fact that the "atmosphere of 'speculation, experiment and creation' – so essential to the quality of higher education -

is widely believed to be promoted by a diverse student body" ("University of California v. Bakke," 1978, pp. 312-312), numerous scholars have attempted to provide empirical justification for what has been labeled the "diversity rationale" (Gurin, Dey, Hurtado, & Gurin, 2002). Much of this research has found compelling evidence that student body racial diversity is correlated with several important outcomes for both students and institutions (Astin, 1993; Chang, 1999; Gurin, 1999; Gurin, et al., 2002; Hurtado, 2001; Pike & Kuh, 2006; Titus, 2004). At the individual level, higher levels of institutional diversity have been found to increase students' critical and complex thinking abilities, improve openness to diversity, and lead to greater satisfaction with the college experience (Gurin, et al., 2002; Milem, 2003). Institutionally, colleges and universities with more diverse student bodies have been found to have faculty who engage in more student-centered approaches to teaching and offer a wider variety of curricular and course offerings than institutions with less student body racial diversity (Milem, 1999, 2003).

Very little research has been conducted, however, linking student body racial diversity to student retention, one of the most salient outcomes for both students and higher education organizations. Of the few studies which have attempted to examine this relationship, the focus has been on how student interactions with diversity affect their likelihood of persistence (Chang, 1996; Titus, 2004). The study of the relationship between diversity and retention from an organizational perspective has been largely ignored. As a result, there is a need within the scholarship on higher education to examine the correlation between student body diversity and an institution of higher education's freshmen retention and six-year graduation rates. Examining this relationship was the goal of this study.

To achieve this goal, this dissertation examined how college and university retention and graduation rates were associated with an institution's student body racial composition. While previous studies examining this relationship have focused primarily on the indirect relationship between student body racial diversity and student attrition, this study is one of the first designed to examine the direct correlation between these variables on institutions of higher education. In addition, this study provides a more nuanced understanding of this relationship by examining the correlation between student body racial diversity and institutional retention and graduation rates conditional on salient institutional characteristics such as institutional control, institutional type, and enrollment size. This study also examines the influence of student body racial diversity on race-specific institutional graduation rates to explore whether student body racial diversity has a different association with an institution's ability to retain students from certain racial/ethnic groups. Specifically, the following research questions guided this study:

1. Controlling for other factors, what is the relationship between structural diversity (a measure of student body racial composition) and an institution's freshmen retention rate?
2. Controlling for other factors, is the relationship between structural diversity and institutional freshmen retention rates conditional on institutional type (i.e., Carnegie Classification, residential vs. non-residential, public vs. private, etc) or institutional enrollment size?
3. Controlling for other factors, is the relationship between structural diversity and institutional freshmen retention rates different for Predominantly White Institutions and Minority-Serving Institutions?

4. Controlling for other factors, what is the relationship between structural diversity and an institution's six-year graduation rate?
5. Controlling for other factors, is the relationship between structural diversity and institutional six-year graduation rates conditional on institutional type or institutional enrollment size?
6. Controlling for other factors, is the relationship between structural diversity and institutional six-year graduation rates different for Predominantly White Institutions and for Minority-Serving Institutions[1]?
7. Controlling for other factors, what is the relationship between structural diversity and an institution's six-year graduation rate for different racial groups?

Overview of Remaining Chapters

The organization of the remainder of this dissertation is as follows. Chapter II provides a review of literature pertaining to college student attrition and the educational impact of racial diversity in American higher education. During this literature review, the argument is made that current research on the impact of student body racial diversity on student retention has failed to provide a clear understanding of the direct relationship between diversity and institutional graduation and retention rates. This is followed with a presentation of the specific research questions to be addressed in this dissertation.

Chapter III begins with an introduction to social categorization theory, similarity/attraction theory, and residentiality, the organizational theories and college student retention concept which combined served as the conceptual frameworks guiding

[1] Minority-serving institutions make up a category of post-secondary educational institutions which included Historically Black Colleges and Universities (HBCUs), Hispanic-Serving Institutions (HSIs) and tribal colleges and universities.

this inquiry into the relationship between diversity and student retention. Chapter III then details the research methodology used for this study. This chapter outlines the sampling methodology, data collection procedures, and statistical techniques used to estimate the influence of student body racial diversity on institutional graduation and retention rates. Chapter IV presents the findings related to research questions focused on examining how variability in institutional freshmen retention rates are correlated with student body diversity while Chapter V presents the results of research questions focused on determining the relationship between student body diversity and institutional six-year graduation rates. The dissertation concludes with Chapter VI which includes a summary of the study's findings and a discussion of the implications of this study for both research and practice.

CHAPTER II

LITERATURE REVIEW

Introduction

The goal of this chapter is to review the areas of literature which serve as the foundation for this study. The chapter begins with a presentation of literature examining the impact of racial diversity on various student and institutional outcomes. This is followed by a review and critique of studies which have attempted to examine the relationship between racial diversity and student persistence at American colleges and universities. The final section of this chapter introduces the specific research questions which guide this study.

Research on the Educational Impact of Diversity in Higher Education

Following the civil rights reforms of the 1960s, many American institutions of higher education began employing affirmative, race-conscious admissions policies in an effort to increase the diversity of university student bodies and as a remedy for past discrimination against minorities, especially African-Americans. These policies, however, have not been without controversy. Legal challenges to race-based programs in the areas of college admissions, employment, and government contracting have resulted in several court decisions expounding on and defining the legality of affirmative action policies.

Two of the more recent of these decisions were the Supreme Court's rulings in Grutter v. Bollinger ("Grutter v. Bollinger," 2003) and Gratz v. Bollinger ("Gratz v. Bollinger," 2003). In these decisions, the Court reaffirmed its ruling from 25 years earlier in the Regents of the University of California v. Bakke ("University of California v. Bakke," 1978) case by upholding the legality of using race-conscious admissions programs in higher education. The rationale for the use of race-conscious admissions, as stated by Justice Powell in 1978, is the belief that colleges and universities have a "compelling interest" in creating diversity among its student body because of the educational benefits of a diverse student population. As noted by Justice Powell in his majority opinion:

> The atmosphere of "speculation, experiment and creation" – so essential to the quality of higher education - is widely believed to be promoted by a diverse student body. … As the Court [438 U.S. 265, 313] noted in Keyishian, it is not too much to say that the "nation's future depends upon leaders trained through wide exposure" to the ideas and mores of students as diverse as this Nation of many peoples ("University of California v. Bakke," 1978, pp. 312-313).

This endorsement of campus racial diversity, which was supported by the majority decision in the *Grutter* case, argues that the constitutionality of race-based admissions programs is in part contingent on the fact that student body racial diversity is correlated with important educational benefits.

Over the past 20 years, a substantial body of research has accumulated examining the idea that ethnic and racial diversity among college students yields significant educational benefits. This research has been summarized in a number of large scale literature reviews. One of the first was from Pascarella and Terenzini (1991) in their review of research on the impact of college attendance on students. Based on their review of studies examining the impact of institutional racial composition, they

concluded that African American students attending a Predominantly White Institution (PWI) had lower cognitive development, occupational status, and academic and social self-concepts as compared to African American students attending a Historically Black College and University (HBCU). These findings suggested that the racial composition of an institution may affect educational outcomes for African American students[2].

A second literature review was published as part of the expert testimony of Patricia Gurin in the Grutter v. Bollinger and Gratz v. Bollinger court cases. In this review, Gurin (1999) reports on the work of several scholars who examined how racial diversity at American colleges and universities is linked with educational and developmental outcomes for students. Her conclusion that student body racial diversity is positively related to a variety of student outcomes is based largely on the results of two empirical studies. Astin's 1993 work, which is heavily cited in the Gurin (1999) literature review, was among the first large scale, multi-institutional studies which examined the educational impact of undergraduate racial composition on student outcomes. In this study, Astin (1993), found evidence that a variety of student experience variables such as cross-racial socialization, discussion of racial issues, and engagement in an ethnic studies course or workshop had a significant positive effect on a range of student academic and personal outcomes from overall satisfaction with college to the likelihood that the student will vote in national elections. Astin also found evidence that students on campuses where there is perceived to be a strong institutional commitment to diversity where more likely to have the goal of promoting racial understanding.

[2] The effects of attending PWIs vs. HBCUs for other racial groups (Whites, Hispanic, Asian, etc.) were not reported by Pascarella and Terenzini (1991).

A second study heavily cited by Gurin (1999) is Mitchell Chang's 1996 doctoral dissertation on racial diversity in higher education. Using data from the Cooperative Institutional Research Program (CIRP) database housed by the Higher Education Research Institute at UCLA, Chang (1996) explored the effect of student interactions with diversity on various educational outcomes. He found evidence that socializing across race and discussing racial and/or ethnic issues had a positive effect on students' overall satisfaction with college, their intellectual self-concept, and their social self-concept. The central element in providing these experiences to students, according to Chang, is a high level of institutional structural diversity, defined as the amount of numerical and/or proportional representation of different racial groups within a college/university's student body. Chang reported that the structural diversity of an institution is positively related to the likelihood that a student reports that he/she has had interactions with students of a different race. Therefore, as noted by Gurin (1999), Chang's results indicate that much of the positive impact of diversity on student learning outcomes are associated directly with diversity-related experiences which occur more frequently on campuses with diverse student bodies. Based on the findings of Astin (1993) and Chang (1999) in addition to the empirical findings of scholars such as Deppe (1989) and Yeakley (1998), Gurin (1999) concluded that the preponderance of evidence from her literature review indicated a positive impact of racial diversity on college student outcomes and a compelling need for institutions of higher education to pursue a racially diverse student body.

Four years after the Gurin (1999) review, Jeffrey Milem published a comprehensive review of "a broad range of social science evidence on the benefits of

diversity in higher education" (Milem, 2003, p. 126). This review used a multi-dimensional framework to describe the benefits of diverse college campuses in four specific areas: the benefits to institutions of higher education, the benefits to the economic and private sector, the benefits to greater society, and the benefits to individual student. In examining the institutional benefits of college/university diversity, Milem relies on research from Milem (1999, 2001) indicating that diversity is positively related to the use of student-centered teaching among faculty, more diverse curriculum offerings, and a greater number of women and faculty of color involved in community and volunteer service. With regard to economic and private sector benefits, Milem (2003) reviews research from scholars including Bikson and Law (1994), Cox (1993), and Reskin (1998). From this review, Milem (2003) found that student interactions with diversity during college has been shown to increase cross-cultural competence, enhance marketing efforts, lead to better organizational problem solving, and increase organizational creativity and innovation. To examine research on the benefits of college and university diversity on society, Milem surveyed the work of Bowen and Bok (1998) and Braddock, Dawkins, and Trent (1994), among others. In this review, Milem (2003) concluded that increased campus diversity leads to higher levels of citizens' engagement with social and political issues, greater societal equality, and increased overall education level of the citizenry. College racial diversity was also found to be negatively related to occupational/residential segregation and stereotyping within society.

Also in 2003, Sylvia Hurtado and colleagues published a review of empirical and theoretical literature on the relationship between diversity and college student development. This review began with an overview of the theory of discontinuity which

has guided much of the recent research on the impact of diversity on college students. Discontinuity, a concept introduced by psychologist Erik Erikson (1946, 1956), states that the development of individuals is in part contingent on an individual leaving their home environment and being immersed in an environment that is diverse and complex enough to encourage intellectual experimentation. Colleges and universities, according to Hurtado et al. (2003), have the unique ability to create this discontinuity for students by creating racially diverse campus environments. Because many students come to college from racially homogenous neighborhoods and high schools, this theory would lead one to hypothesize that racially diverse colleges and universities create conditions that "challenge rather than replicate the ideas and experiences students bring with them from their home environments" (Hurtado, et al., 2003, p. 152). This ability to create "incongruence" between home and college should lead students attending more diverse campuses to have higher levels of personal and cognitive growth.

Much of the research cited by Hurtado et al. (2003) supports this hypothesis. Specifically, Hurtado et al. cited research which found that students attending more diverse college and university campuses are more likely to socialize with others outside their own race. These opportunities for diverse interactions were in turn found to be positively correlated with many of the same outcomes noted in previous reviews, namely increased cognitive abilities, a greater ability to engage in high levels of critical thinking, and greater social concern and humanitarian values.

Hurtado et al. (2003) also noted the positive impact of diversity on other cognitive and developmental outcomes not mentioned in previous reviews. Citing the work of Hurtado (2001), it was noted that student interactions with diversity were positively

related to students' perceived ability to work in a cooperative manner and to be tolerant of different beliefs. Citing Antonio (2001), it was also found that contact with diverse peers increased students' self reported leadership ability and cultural understanding. Hurtado et al. (2003) also cited research which suggests that students who participate in intergroup racial programs were more comfortable with conflict as a normal part of social life. In sum, Hurtado et al. concluded from their literature review that:

> the educational research on contact with diverse peer groups suggest that campuses that have successfully attracted sufficient numbers of students from different racial/ethnic groups are producing graduates with more critical thinking skills, who are at ease in addressing complex and sometimes conflict-laden problems, and who are more prepared to participate in a diverse democracy by acknowledging and respecting group differences (Hurtado, et al., 2003, p. 181).

In an update to his 2003 review, Jeffrey Milem along with Mitchell Chang and Anthony Lising Antonio published a literature synthesis in 2005 which attempted to summarize the major findings of previous research on the educational impact of student body racial diversity while also reviewing the findings of more recent research on the topic. Again, the findings of this synopsis indicate that the preponderance of empirical research on the impact of diversity in higher education demonstrate the educational benefits of racially diverse learning environments. Among the new findings reported in this review were the positive relationship between student body racial diversity and a broader collection of ideas, thoughts, and opinions among a student body, the positive impact of diverse interactions on student development of values and ethical standards, and the positive impact of diversity on helping students develop a better understanding of the norms of behavior for cross-racial interaction (Milem, Chang, & Antonio, 2005).

The general consensus among the aforementioned literature reviews is that student body racial diversity is positively correlated with a variety of educational benefits including student cognitive development, critical thinking skills, educational satisfaction, democratic values, and ability to interact with individuals of other races/ethnicities. In recent years, however, there has been a growing body of research which cast doubt on some of these findings. In his study on diversity and educational benefits, Serge Herzog (2007) reviews much of this research. Schoenecker et al. (1997) failed to find a positive correlation between group diversity and group performance in management capstone classes at both the undergraduate and graduate level. Brehm (2004) also failed to find a positive relationship between taking a diversity-related course and student support for policies that promote gender and racial harmony. Using the College and Beyond dataset along with comprehensive student records and follow-up surveys, Arcidiacono and Vigdor (2004) found that graduating from a more diverse college or university had no significant link to post-graduation income, the attainment of post-graduate degrees, or life satisfaction. Hanson, Owan and Pan (2006) found no significant link between a group's ethnic/racial composition and either their group or individual academic performance in a single undergraduate management course. Herzog (2007), in a study of 6,000 students at a public university, found no pattern of positive correlations between objective measures of academic achievement (i.e., GPA, GRE/GMAT scores, and graduate school enrollment) and either campus compositional diversity, student curricular diversity, or student interactional diversity.

Herzog (2007) also notes that a different look at Astin's (1993) study leads to different conclusions than those regularly cited in literature reviews on the impact of

student body diversity. As mentioned earlier, Astin (1993) found some evidence that student interaction with diversity was positively related to several educational outcomes. Herzog, however, notes that Astin found no significant positive correlation associated with the racial/ethnic composition of a college campus and student outcomes. Astin also concluded that the diversity of a college/university's curricula produced very few significant direct effects on student outcomes.

In sum, research on the educational impact of diversity in higher education has generally found that student interactions with various forms of diversity while in college positively impact a variety of outcomes including critical thinking skills, perceived ability to work with others in a cooperative manner, leadership abilities, and levels of cultural understanding. A smaller body of research, on the other hand, has found diversity in higher education to have no significant relationship with student or institutional outcomes.

Research on the Impact of Diversity in Higher Education on College Student Retention

The research presented in the previous section largely suggests that diversity does have some impact on several higher education outcomes. While research on the educational impact of diversity in higher education has examined a wide variety of both student and institutional outcomes, one outcome that has received surprisingly little attention within this body of literature is college student retention. Student retention and graduation is an important outcome both for students and institutions of higher education, yet only a few studies have attempted to examine the impact of racial diversity on student

retention and graduation. Pascarella and Terenzini (1991) found evidence that African American students attending HBCUs had a higher likelihood of bachelor degree completion than African American students attending PWIs. This suggests that for African American students, higher levels of student body racial heterogeneity may have a negative impact on the retention of African American students.

Astin's (1993) much cited work also looked specifically at diversity and degree attainment. After controlling for a wide range of student and institutional variables, Astin found a negative relationship between the percentage of Latino students enrolled at an institution and the bachelor's degree attainment of students at the institution. In her study using a national sample of over 8,000 female students, Tsui (1995) found student body racial diversity to have a negative impact on the degree aspirations of female students. Titus (2004), on the other hand, failed to find a significant relationship between institutional racial composition and student retention. Using hierarchical generalized linear modeling on a sample of over 5,000 students attending 384 four-year institutions of higher education, Titus found institutional student body racial diversity to be unrelated to college student persistence[3].

Other studies on the relationship between diversity and retention have found different results than those of the aforementioned scholars. The most cited study used as evidence of the positive impact of diversity on retention is from Chang's 1996 dissertation. Chang (1996) found that socializing across race and engaging in discussions about racial/ethnic issues was positively related to students' likelihood of staying enrolled in college. Because institutional student body racial diversity was found to be positively

[3] Titus (2004) defines persistence as an individual student being enrolled or having completed an undergraduate degree program 3 years after first enrolling in a four-year college or university.

related to student socialization across races, Chang concluded that student body racial diversity has a positive indirect effect on college student retention. Carter (1999) found evidence that student body racial diversity was positively related to the degree aspirations of African American students, but had no impact on the degree aspirations of White students.

In conclusion, research on the impact of diversity in higher education on college student retention is inconclusive and incomplete. The inconclusiveness is the result of the contradictory findings of previous research on this topic. The incompleteness results from the relative lack of research on this topic. The incompleteness of this body of research is also evident in the fact that each of the aforementioned studies on the relationship between retention and diversity focuses on how individual students' interactions with diversity impact the likelihood of their degree completion. In other words, the unit of analysis for most of the studies reviewed in this section was the individual student. While this provides important information for the higher education community, it does not provide the information necessary to understand the influence of racial diversity on college student persistence from an organizational perspective. Specifically, focusing on students as the unit of analysis, as opposed to the institution, does not allow for the understanding of the direct relationship between racial diversity and institutional retention and graduation rates. In addition, much of the aforementioned literature has focused almost exclusively on the indirect influence of diversity on student persistence. Again, while this is valuable information, the higher education community lacks empirical evidence on the direct relationship between student body racial diversity and the retention and graduation rates of American colleges and universities.

Research Questions

In an attempt to address this void in literature on diversity and college student attrition, the purpose of this dissertation was to examine the association between student body racial diversity and the freshmen retention and six-year graduation rates of American four-year colleges and universities. More specifically, this study examined the following research questions:

1. Controlling for other factors, what is the relationship between structural diversity (a measure of student body racial composition) and an institution's freshmen retention rate?
2. Controlling for other factors, is the relationship between structural diversity and institutional freshmen retention rates conditional on institutional type (i.e., Carnegie Classification, residential vs. non-residential, public vs. private, etc) or institutional enrollment size?
3. Controlling for other factors, is the relationship between structural diversity and institutional freshmen retention rates different for Predominantly White Institutions and Minority-Serving Institutions?
4. Controlling for other factors, what is the relationship between structural diversity and an institution's six-year graduation rate?
5. Controlling for other factors, is the relationship between structural diversity and institutional six-year graduation rates conditional on institutional type or institutional enrollment size?

6. Controlling for other factors, is the relationship between structural diversity and institutional six-year graduation rates different for Predominantly White Institutions and for Minority-Serving Institutions?
7. Controlling for other factors, what is the relationship between structural diversity and an institution's six-year graduation rate for different racial groups?[4]

The rationales, theoretical foundations, and hypotheses related to these questions are described in Chapter III.

Chapter Summary

This chapter began with an overview of previous research examining the impact of student body racial diversity on college student educational outcomes. This literature review revealed that, while scholars have examined the impact of diversity on a wide variety of outcomes, student persistence is one outcome that has received relatively little attention. This is especially true with regard to research on the impact of diversity on student retention from an organizational perspective. No research to date has attempted to examine the influence of the racial composition of a college/university's student body on that institution's freshmen retention and six-year graduation rates. In an attempt to address this void in literature, seven primary research questions were presented which were addressed in this study.

[4] As noted later in this dissertation, the relationship between student body racial diversity and race-specific freshmen retention rates could not be examined due to a lack of available data.

CHAPTER III

THEORETICAL FRAMEWORK, METHODOLOGY, AND RESEARCH DESIGN

In this chapter, the theoretical framework and research methodology used for this study of the relationship between college student racial diversity and institutional retention and graduation rates are presented. The chapter begins with a description of the study's theoretical framework followed by a detailing of the methods used to obtain the institutional data analyzed in this study. This is followed by a description of the variables selected for analyses and of the data analysis techniques used. The chapter ends with a section noting the study's limitations.

Theoretical Framework

The theoretical underpinnings of most empirical work relating racial diversity to organizational performance comes from the study of group psychology (Pitts & Jarry, 2007). Two of these psychological theories, social categorization theory and similarity/attraction theory, along with the concept of "residentiality" were used to create the theoretical framework for this study. While these theories and concepts primary attempt to explain group behavior within an organizational setting, they can also be used as a lens for understanding organizational behavior given the strong linkages between individual actions and organizational behavior/performance. As noted by scholars who view organizations from a transactionalist perspective, the attitudes and behaviors of individuals within an organizational environment affect all parts of organizational performance (Mayo, Pastor, & Wapner, 1995). This linkage between individual behavior

and organizational performance make the aforementioned theories an ideal starting point for understanding the potential relationship between organizational racial composition and institution turnover.

The most commonly used theory to explore the relationship between diversity and organizational outcomes is social categorization theory (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987; K. Williams & O'Reilly, 1998). Drawing on the ideas of group psychology, individualism, and interactionism, this theory starts with the assumption that every individual wishes to maximize his/her level of self-esteem. This is often achieved via social comparisons with others. The first step in making these social comparisons is for an individual to define him/herself. This is accomplished through a process of self-categorization in which an individual classifies him/herself and others into social categories using salient characteristics such as age, race, religion, gender, and organizational membership, among others. Through this process, an individual is able to define their social identity as a member of a given group in comparison to members of another group (Tajfel & Turner, 1985). Given an individual's desire to maintain high levels of self-esteem, social categorization theory states that individuals will often deem their group more attractive than other groups and may work to maximize intergroup distinctions. An individual's "in group" is considered good while individuals belonging to an "out-group" are considered bad (Pitts & Jarry, 2007). Several studies have shown the categorizing people into groups can lead members of an "in-group" to perceive members of an "out-group" as less honest, trustworthy, intelligent, or cooperative (Brewer, 1979; Hogg & Abrams, 1988; Stephan & Stephan, 1996; Tajfel, 1982).

This process of social categorization has been found to be a powerful tool in understanding the influence of racial diversity on organizational outcomes. As noted by Messick and Massie (1989), the process of self-categorization often relies on physical traits such as gender, race, and ethnicity. Therefore, several researchers have used this theory to examine how ethnic and racial diversity within organizations affect various organizational outcomes. The results of this research have shown increased racial diversity within organizations to be correlated with decreased satisfaction within the organization, lower levels of cohesiveness, higher levels of conflict, and increased turnover within an organization (Crocker & Major, 1989; Moreland, 1985; Pelled, 1996; Pelled, Eisenhardt, & Xin, 1999; Riordan & Shore, 1997; Triandis, Kurowski, & Gelfand, 1994). While some studies using this theory have shown racial diversity to be positively related to some organizational outcomes, studies showing a negative relationship between racial diversity and organizational performance and turnover have been more prevalent (Pitts & Jarry, 2007).

In summary, social categorization theory states that through the process of self-categorization, individuals within organizations create in-groups and out-groups based primarily on characteristics such as gender, race, and ethnicity. As diversity increases, differences between in-groups and out-groups become more salient and negative as in-group members attribute negative qualities to out-group members. As a result, this theory suggests that diversity has a negative effect on organizational performance and specifically organizational turnover.

A second common framework for studying organizational racial diversity is the similarity/attraction theory. This theory originated with the work of Donn Byrne in 1971.

After reviewing literature from a variety of fields related to similarity and dissimilarity, Byrne (1971) proposed that people prefer to interact with others who are similar to them on a wide variety of attributes ranging from attitudes and values to demographic characteristics such as race and gender (Baskett, 1973; Byrne, Clore, & Worchel, 1966). This desire for similarity in interactions is based on to the belief that individuals who are similar in background and life experiences find interacting with each other more pleasurable due to increased ease of communication, the faster development of rapport, and the higher likelihood that their values and opinions will be validated (Geddes & Konrad, 2003). Support of this idea comes from research which has found that in free choice situations where an individual can interact with a variety of people, there is a strong tendency for an individual to interact with the person that is most similar to him or her (K. Williams & O'Reilly, 1998).

With regard to organizational outcomes, the predictions of similarity-attraction theory are similar to the predictions of social categorization theory. Heterogeneity in organizational groups is predicted to have a negative impact on a variety of organizational performance measures. Most of the organizational research using the similarity-attraction framework has found support for this prediction. Heterogeneous organizations have been found have increased and intensified organizational conflict, reduced individual satisfaction, increased work pressures, and increased employee turnover (Horwitz, 2005; Jehn, Northcraft, & Neale, 1999; Pfeffer, 1983; A. Tsui & O'Reilly, 1989).

Both social categorization theory and similarity-attraction theory suggest that increases in organizational racial diversity will have a negative impact on organizational

performance and more specifically a negative impact on organizational member turnover. Therefore, based on these theories, it would be predicted that increases in student body racial diversity are correlated with a reduction in the organizational performance of colleges and universities in the area of student retention.

Both social categorization theory and similarity-attraction theory suggest that increases in organizational racial diversity may adversely impact various functions and processes within postsecondary educational institutions. Colleges and universities, like all other organizations, are actively involved in the value creation process. One of the critical steps in the value creation process involves the conversion of inputs into output (Jones, 2009). Social categorization theory and similarity-attraction theory suggest that within institutions of higher education, the attitudes and activities towards diversity of individuals and groups may hinder the ability of colleges to convert inputs (students) into outputs (graduates). Therefore, the processes found at the individual and group level could play a critical role in organizational processes with regard to value creation.

Individual attitudes and behavior towards diversity as predicted by social categorization and similarity-attraction theory may also influence organization functioning by making it more difficult for an organization to create and maintain the type of organizational culture which encourages shareholder commitment to the institution. Management sciences research has found strong empirical evidence that institutional culture plays an important role in employee/shareholder turnover (Deery & Shaw, 1999; Sheridan, 1992). Since an organization's culture is in large part created, maintained, and changed by people within an organization, it would suggest that group attitudes among shareholders within colleges and universities which serve to create the

larger culture of an educational organization have the ability to effect organizational performance in the area of student persistence.

The concept of "residentiality" also suggests that higher levels of student body racial diversity may have a negative impact on college and university retention and graduation rates. Tinto (1993) and Kamens (1977) each identify residentiality as an important idea for understanding college student persistence. Residentiality refers to the role of colleges and universities in creating an identity for students. Often, going to college involves a student leaving membership and participation in previous "associations" and adapting or integrating into the new culture of his/her chosen college (Kamens, 1977; Tinto, 1993). Students who are unable to fully integrate into the social community of their campus environment, according to this idea, are less likely to persist. The power of residentiality in the student retention process is well noted throughout the research literature on college student dropout (Braxton & McClendon, 2001-2002). As noted by Astin (1975), students chances of finishing college are maximized by engaging in residentiality-building activities such as living in a college dormitory or fraternity house, participating in campus organizations, and having a part-time on campus job.

Therefore, for colleges and universities to increase their performance in the area of student persistence, they must engage in practices which create a sense of residentiality among their student body. Student body racial homogeneity may be one mechanism institutions of higher education use to create this residentiality. Because many students who enroll in college come from racially segregated backgrounds with regard to their neighborhoods and secondary educational institutions (Frankenberg, Lee, & Orfield, 2003), colleges and universities with racially homogenous student bodies may reduce the

amount of transition for students coming from high school to college. By reducing this transition "shock" for its students, it may be that the institutionalization of student retention is supported by the creation of racially homogenous student bodies. There is some evidence of this. As mentioned earlier, studies have found that African American students are more likely to complete their degrees at racially homogenous HBCUs than African American students enrolled at PWIs (Allen, Epps, & Haniff, 1991; Astin, Tsui, & Avalos, 1996).

With these tenets in place, hypotheses as implied by social categorization theory, similarity-attraction theory, "residentiality", and previous research on the educational impact of student body racial diversity for each of the study's primary research questions are presented below.

Research Questions 1 and 4:

While empirical research examining the influence of racial diversity on institutional retention and graduation rates is scarce, social categorization theory and similarity-attraction theory offer compelling frameworks from which to hypothesize about this relationship. If it is believed that diversity adversely effects organizational performance, as suggested by each of the aforementioned theories, then colleges and universities with higher levels of student body racial diversity should have lower overall six-year graduation rates and freshmen retention rates, ceteris paribus.

Research Questions 2 and 5:

The tenets of social categorization theory suggest that diversity reduces the level of solidarity within an organization which leads to reduced organizational effectiveness.

Some research has found, however, that organizations with strong collectivistic cultures which create a salient shared identity among organizational member may reduce the impact of social categorization on organizational performance (Chatman, Polzer, Barsade, & Neale, 1998; O'Reilly & Chatman, 1996). Within higher education, institutions such as liberal arts schools, schools where student primarily live on-campus, private schools, and schools with smaller student enrollment are believed to create a stronger shared identity among students than others. Therefore, it was hypothesized that the relationship between student body racial diversity and college and university retention and graduation rates will be conditional on institutional type and size.

Research Questions 3 and 6:

Using the concept of residentiality, it would be predicted that at PWIs, higher levels of student body racial diversity would have a more negative association with the graduation rates of White students. This is because higher levels of diversity at PWIs may decrease the ease with which White students can fully integrate into the social community of an institution. The opposite relationship would be hypothesized for Minority students. As student body racial diversity increases, Minority students may find it easier to integrate into a campus community, which would increase Minority students' graduation rates. A similar, but directionally different, relationship is hypothesized for MSIs. Specifically, increases in diversity at MSIs would be associated with lower graduation rates of Minority students and increased graduation rates among White students.

Research Question 7:

As noted in the hypotheses for research questions 3 and 6, theory would suggest that race-specific graduation rates would be differentially associated with changes in student body racial diversity. The graduation rates of majority students were predicted to be negatively related to institutional racial diversity while the graduation rates of Minority students were expected to be positively related to institutional racial diversity.

Methodology for Obtaining Study Institutions

The population of interest for this study was U.S., four-year, not-for-profit, non-special focus institutions of higher education with Carnegie Classifications as research universities, master's colleges and universities, and baccalaureate colleges. Using data from The Carnegie Foundation for the Advancement of Teaching, colleges and universities were separated into three groups based on their 2000 Carnegie Classification. Institutions labeled by the Carnegie Classification as Doctoral/Research Universities-Extensive or Doctoral/Research Universities-Intensive were placed into one group and labeled "Research Universities." Institutions labeled by Carnegie as Master's Colleges and Universities I or Master's Colleges and Universities II were placed into a group labeled "Master's Colleges and Universities." The final group consisted of institutions labeled by Carnegie as Baccalaureate Colleges-Liberal Arts or Baccalaureate Colleges-General. These institutions were labeled "Baccalaureate Colleges."

After removing for-profit institutions, institutions located outside the fifty states in the United States, and special focus institutions (i.e., professional schools or seminaries), institutions with extremely small freshmen undergraduate enrollments were removed. Given the nature of this study and the use of institutional retention and

graduation percentages as the outcome variable, institutions with very small freshmen enrollments could have dramatic shift in their retention and graduation rates based on the decision of one or two students. These shifts may skew the data and lead to results that are biased. Therefore, it was decided that institutions with freshmen enrollments of less than 100 students in any year in which data were collected would be dropped. The 100 student cutoff was chosen based on preliminary analysis of the data which showed that a freshmen enrollment of 100 was a natural dividing point between small and extremely small colleges and universities.

Using this methodology, two analytic groups were composed. For research questions which examined the relationship between student body racial diversity and six-year graduation rates, institutions with enrollments of less than 100 students in 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001 or 2002[5] were dropped. This resulted in an analytic group (which was labeled the "Graduation Rate Group") which consisted of 241 institutions labeled as "Research Universities", 487 labeled as "Master's Colleges and Universities", and 384 labeled as "Baccalaureate Colleges". In total, the 1112 institutions making up this analytic group represent around 70 percent of the four-year, nonprofit, non-special focus colleges and universities in the United States according to the 2008 Almanac edition of *The Chronicle of Higher Education* (Almanac of Higher Education, 2008). For research questions which examined the relationship between student body racial diversity and retention rates, institutions with enrollments of less than 100 in 2003, 2004, 2005, 2006, or 2007[6] were dropped. This resulted in an analytic group (which was labeled the "Retention Rate Group") which consisted of 245

[5] These are the cohort years which correspond to the years in which six-year graduation rate data were available.
[6] These are the cohort years which correspond to the years in which freshmen retention data were available.

institutions labeled as “Research Universities”, 549 labeled as “Master’s Colleges and Universities”, and 448 labeled as “Baccalaureate Colleges”. In total, the 1242 institutions making up this analytic group represent 78 percent of the four-year, nonprofit, non-special focus colleges and universities in the United States according to the 2008 Almanac edition of *The Chronicle of Higher Education* (Almanac of Higher Education, 2008).

Variables

Two primary outcome (dependent) variables and 13 independent variables were used for this quantitative analysis. Each outcome measure is described below followed by a description of the independent variable of interest (structural racial diversity) and each control variable.

Six-Year Graduation Rate

Two measures are commonly used as indicators of a college/university’s ability retain students: six-year graduation rates and freshmen retention rates. Each of these measures was used as a dependent variable in this study. The six-year graduation rate for each institution sampled was extracted from the U.S. Department of Education’s Integrated Postsecondary Education Data System (IPEDS). IPEDS provides institutional level data on postsecondary institutions dating back to 1986. Since 1997, IPEDS has collected and published data on the six-year graduation rates of colleges and universities. According to IPEDS, this six-year graduation rate variable is the percentage of first-time, full-time, degree-seeking students that entered the college/university six years prior to the

reporting year and who completed all the necessary requirements for graduation (National Center for Education Statistics, 2009). In addition to aggregate institutional graduation rates, IPEDS provides gender and race-specific graduation rate data.

Overall and race-specific six-year graduation rate data were collected for each of the 1112 colleges and universities in this study's analytic group from 1997-2008[7] (Graduate Rate Group). This corresponded to 12 cohorts of students; 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, and 2002. The race-specific graduation rates collected were for African American, Asian, Hispanic, White, and all Minority (a composite of African American, Asian, and Hispanic) students.

Freshmen Retention Rates

Freshmen retention rates for each of the sampled institutions were also collected via IPEDS. IPEDS defines this as the percent of the first-time, full-time, degree-seeking students from the previous year's cohort that re-enrolled at the institution as either full- or part-time in the following year (National Center for Education Statistics, 2009). This variable is only available in the aggregate, preventing any analysis using race-specific dependent variables.

The first year IPEDS reports data on institutional freshmen retention rates is 2003. A very low percentage of institutions, however, reported data in this year. Therefore, freshmen retention rate data from 1242 institutions from 2004-2008[8] were collected (Retention Rate Group). This corresponded with 5 cohorts of students; 2003, 2004, 2005, 2006 and 2007.

[7] These years were chosen because they are the only years in which six-year graduation rates are available through IPEDS.

[8] In 2003, around 60% of all institutions in the IPEDS dataset did not report their freshmen retention rate. In the following year and in subsequent years, less than 2% of institutions did not report their freshmen retention rates.

Structural Racial Diversity

The primary independent variable of interest for this study was student body racial diversity as measured by a college/university's undergraduate structural diversity. The operationalization of this variable was a modified version of the diversity index used by Chang (1996, 1999). As noted by Chang (1996), many common measures of campus racial diversity such as calculations of the proportion of White and Minority students or the use of simple percentages of various racial groups (White, Black, Asian, etc.) have many limitations. One of these shortcomings is that many of these common measures fail to create one overall measure of an institution's level of racial diversity. Chang's index calculates the overall racial composition of an institution's undergraduate student body by measuring the variance in student populations across four racial/ethnic groups: African American (Black), Asian, Caucasian (White), and Hispanic/Latino (Hispanic). This variance is measured using the following formula:

$$1 - \sqrt{\frac{(\%\ \text{Asian} - \mu)^2 + (\%\ \text{Black} - \mu)^2 + (\%\ \text{Hispanic} - \mu)^2 + (\%\ \text{White} - \mu)^2}{4}} * 100 \qquad (1)$$

The value for μ in equation 1 is the sum of the percentages of Asian, Black, Hispanic, and White undergraduate students at an institution divided by four. This index awards a higher score to institutions with more heterogeneous student bodies. As a result, institutions with an undergraduate population that is 25% Asian, 25% Black, 25% Hispanic, and 25% White will have a higher structural diversity score than an institution with a population that is 5% Asian, 10% Black, 5% Hispanic, and 80% White. The version of the diversity index used in this study differs from Chang's index in that, for

this study, the variance score was subtracted from 1 then multiplied by 100 while in the Chang (1996) version the reciprocal of the variation score is used. The version used in this study, which is very similar to that used by Pike and Kuh (2006), was used in order to get institutional structural diversity scores which ranged from 0 to 100. Data for the calculation of this index score were collected from the IPEDS dataset.

In order to ensure data consistency, a redistribution procedure was used for students labeled by their institution as "race unknown". Within the IPEDS data set, student enrollments are separated into seven racial categories: Nonresident Alien, White, Black, Hispanic, Asian, American Indian/Alaska Native, and Race Unknown. A common procedure used to account for students in the race unknown category when calculating campus racial diversity scores has been to place all students in the race unknown category into the White category. This is the method used by the US News and World Reports in their rankings of campus racial diversity (Morse, 2010).

This method, however, is inconsistent with the way in which IPEDS has redistributed race unknown students over the years. From 1990 to 1998, IPEDS provides institutional enrollment data that are "raked" such that the race unknown students were distributed into one of four (Black, White, Hispanic, Asian) race categories based on the known racial distribution of the institution. For example, if an institution was known to have a 35 percent Hispanic enrollment based on data from students who did identify into a racial group, 35 percent of that institution's race unknown students were redistributed into the Hispanic student category. IPEDS stopped reporting "raked" data in 1999. In order to ensure data consistency, a researcher-created raking procedure very similar to the procedure used by IPEDS from 1990-1998 was used on student enrollment data from

1999 to 2009. Students in the race unknown category were redistributed into one of four racial groups (Black, White, Hispanic, Asian) based on the racial distribution of students with known racial identities[9]. Given that the student body racial composition of an institution is expected to be relatively stable from year to year, a preliminary analysis comparing the results of the redistribution procedure used in 1998 by IPEDS and the redistribution procedure used in this study for the 1999 data set was completed. This showed that this study's redistribution procedures produced very similar results to the redistribution procedure used by IPEDS. Any changes in student body racial composition from 1998 to 1999 appeared to be the result of new student enrollment and not the redistribution method used. The redistribution of race unknowns using the procedure employed in this study not only ensures data consistency, but is also likely to be much more accurate than redistributing all race unknown students into any one racial category.

Control Variables

The remaining variables collected for this study were designed to control for other factors known to have an impact on college and university retention and graduation rates. These variables, which are detailed below, were institutional size, institutional expenditures on academic and student support services, institutional control, institutional location, institutional type, tuition cost, institutional selectivity, commuter status, percent male of incoming class, percent Minority of incoming class, and percent of student body receiving federal Pell grant aid.

[9] Using this methodology, schools which reported 100% of their student body as race unknown could not have their race unknown students redistributed into known racial categories. No institution used in this study, however, reported 100% of their students as race unknown.

Institutional Size

As noted by Pascarella and Terenzini (1991), institutional size has been found to be a good predictor of institutional retention and graduate rates with smaller and medium-sized institutions having higher retention and graduation rates. For this study, institutional size was measured using the total full-time undergraduate enrollment of a college/university. These data were collected from the IPEDS Enrollment Survey.

Institutional Expenditures on Academic and Student Support Services

Several scholars examining college student retention from an organizational perspective have found institutional expenditures on academic support and student services to be strongly related to institutional performance (Hayek, 2001) and college/university retention and graduation rates (Gansemer-Topf & Schuh, 2006; Ryan, 2004). To control for this, institutional academic support services and institutional student support services expenditures per full-time undergraduate student were calculated using data from the IPEDS Finance Survey. Academic support expenses is defined by IPEDS as the sum of all operating expenses associated with activities and services that support the institution's primary missions of instruction, research, and public service. Student services expenditures is defined as the sum of all operating expenses associated with admissions, registrar activities, and activities whose primary purpose is to contribute to students' emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program (National Center for Education Statistics, 2009).

Institutional Control

Pascarella and Terenzini (1991) as well as Tinto (2003) have noted that, generally, public institutions have lower graduation rates in comparison to private institutions. To control for this, institutional control (public or private) was collected from the IPEDS Institutional Characteristics Survey.

Institutional Location

Institutional location, defined as whether the institution is located in a urban, small town or rural setting, has been shown to be an important environmental characteristic in predicting a variety of college/university outcomes including institutional retention (Berger & Milem, 2000). To control for this, the IPEDS Institutional Characteristics Survey was used to obtain a measure of the degree of urbanization of the city in which an institution is located. This measure groups colleges and universities into 4 categories: city, suburb, town, and rural.

Institutional Type

As noted earlier, the institutions used for this study fall into three Carnegie Classification categories: Research Universities, Master's Colleges and Universities, and Baccalaureate Colleges. These Carnegie Classification categories were used as control variables to account for the variation in institutional graduation rates by institutional type. Several studies have found institutional type to have an impact on institutional retention rates (Astin & Oseguera, 2005; Astin, et al., 1996; Hamrick, Schuh, & Shelley, 2004).

Tuition Cost

Educational costs including room, board, tuition and fees have been found to have an impact on both student academic success and attrition (Nora & Cabrera, 1996; St John, Cabrera, et al., 2000). In addition, institutional prestige is often positively

correlated with institutional cost (Ehrenberg, 2000)[10]. Therefore, controlling for this variable would serve as an important proxy for institutional quality, which is also generally believed to be positively associated with retention. To do this, data on the average room, board, tuition and fees paid by in-state students[11] were collected from the IPEDS Institutional Characteristics survey.

Institutional Selectivity

Selectivity is an institutional characteristic that must be controlled for if the hope is to obtain an unbiased estimate of the impact of the independent variable of interest (student body racial diversity) on each of the dependent variables (freshmen retention and six-year graduation rates) in this study. There is very little debate within the higher education community regarding the strength of the correlation between selectivity and institutional retention and graduation rates (Astin, 1975, 1997; Choy, 2002; Lotkowski, Robbins, & Noeth, 2004; Spady, 1971; Tinto, 1987, 1993).

Selectivity was controlled for in this study using data collected from the 2001 *Barron's Profile of American Colleges* institutional selectivity index. As noted earlier, the data collected to examine the impact of student body racial diversity on institutional graduation rates corresponds to cohorts of students from 1991-2002. IPEDS data does not provide any measure of institutional selectivity over this time frame. The Barron's institutional selectivity index, however, groups institutions into 6 categories (most competitive, highly competitive, very competitive, competitive, less competitive, and noncompetitive) based on the standardized test scores of an incoming class, the high

[10] While tuition cost may not effectively signal the prestige of some state institutions such as Cal-Berkeley or the University of Texas, as a whole within higher education tuition cost are strongly correlated with prestige.

[11] It was decided that using in-state tuition and fees would be the best measure because the majority of students at public institutions pay in-state tuition and fees. At private institutions most students pay the same tuition and fees regardless of residency.

school class rankings and grade point averages of students in an incoming class, and the percentage of applicants accepted in an incoming class (Barron's Educational Series, 2001). In the Barron's 2001 Guide, membership into each of these categories was determined using data from the 1999-2000 Freshmen class. Therefore, the Barron's 2001 Guide provides a snapshot of institutional selectivity in 1999. This snapshot was the category value given for each of the other 5 cohorts used to examine the relationship between racial diversity and graduation rates. For example, institutions rated as "competitive" in the 2001 Barron's Guide were rated as "competitive" in 1991 through 2002. The major limitation of this method is that institutions may have changed their level of selectivity over this time period. Evidence would suggest, however, that this is unlikely. Hoxby (1998) noted in her study on the economic returns of a college education that Barron's selectivity variables had changed so little over the years that institutional classification in 1980 was not significantly different than institutional classification in 1996. Given this stability over such a long period of time found by Hoxby, it is believed that this same stability would be evident in institutional selectivity classification from 1991 to 1999 and from 1999 to 2002.

This same measure was used to control for selectivity in equations examining the relationship between racial diversity and freshmen retention rates. Though IPEDS does report data on institutional acceptance rates and the average SAT scores of students in an institution's freshmen cohort beginning in 2003, a large number of institutions used in this dataset chose not to report this information to IPEDS from 2003-2006. Therefore, it was decided that using the 2001 Barron's measure of selectivity would provide a more

complete and accurate measure of institutional selectivity than using IPEDS data on selectivity and student SAT scores.

Commuter School

Numerous scholars have found evidence that institutions with a higher percentage of students living on campus have higher retention and graduation rates (Astin, 1973; Braxton & McClendon, 2001-2002; Peltier, Laden, & Matranga, 1999-2000; Tinto, 1993; Titus, 2004; Ziskin, Hossler, & Kim, 2009-2010). To control for this variation, a measure of the degree to which an institution is a "commuter school" was used. This measure comes from the Carnegie Classification "size and setting" classification. Using institutional data from 2003 and 2004, institutions were group by Carnegie into 3 categories. Institutions were placed into the group labeled "Primarily Commuter" if less than 25% of degree-seeking undergraduates lived on campus. Institutions were labeled "Primarily Non-Commuter" if between 25% and 49% of degree-seeking undergraduates lived on campus. The final label, "Highly Non-Commuter," was given to institutions in which over 50% of degree-seeking students lived on campus. This institutional label was used for each year of analysis.

One limitation of using the Carnegie measure of the degree to which an institution is a commuter school is that these labels are time-specific snapshots of an institution based on the 2003 and 2004 school years. It is possible that institutions may have different classifications at different time points. Given that institutional data used in this study ranges from 1991-2007, it is especially possible that institutions in the early years of this dataset (1991-2001) may be more or less commuter than they are in later years (2002-2006). To examine this as a possibility, a preliminary analysis of 60 colleges and

universities of various types was conducted to examine whether there was significant variation in the percentage of students living on campus from the mid-1990s to the late 2000s. Using institutional factbooks, available common data set surveys, and personal contact with institutional representatives, it was found that in only three cases has the number of students living on campus changed significantly enough that the institution would be in a different "Commuter" category in the mid-1990s and the late 2000s. This relative stability in students living on campus assuaged some of the aforementioned concerns. A lack of year-specific residentiality information, however, is an important limitation of this study.

Percent Male of Incoming Class

Gender has been found to be a significant factor in predicting student degree completion. Specifically, various national studies (Astin, 1993; Astin & Oseguera, 2005; Astin, et al., 1996) have found that female students, as compared to male students, are more likely to obtain a bachelor's degree. From an organizational perspective, these findings indicate that the percentage of male students in an incoming cohort may play a significant role in an institution's retention and graduation rates. To control for this, variables from the IPEDS Enrollment Survey were manipulated in order to obtain a measure of the percent of freshmen in an incoming cohort who were male.

Percent Minority of Incoming Class

Several reports in recent years have noted a graduation gap between Minority and non-Minority students. According to the 2009 report from the Southern Regional Education Board on postsecondary completion rates, approximately 43% of Hispanic students and 40% of Black students nationwide graduated from a college or university in

six years in 2007 compared with 58% of White students (Nealy, 2009). In a report cited as one of the most comprehensive studies of Minority student college achievement (De Vise, 2009), The Education Trust also found that Minority students enrolling in both four-year and two-year institutions were less likely to graduate than non-Minority students (Engle & Lynch, 2009). These findings suggest that institutions with a higher percentage of minorities in their freshmen class would have lower retention and graduation rates. This is controlled for using data from the IPEDS Enrollment Survey. These data were manipulated to calculate a percentage of first-time, full-time, degree-seeking students in a cohort who are racial minorities (African American, Asian, Hispanic, and Native American).

Percent of Student Body Receiving Federal Pell Grant Aid

While the majority of research on the impact of federal financial aid on college student behavior has focused on the impact of aid on student enrollment, a growing number of scholars have found evidence of a significant relationship between need-based aid and student persistence (Bettinger, 2004; DesJardins, Ahlburg, & McCall, 1999; St John, Hu, & Weber, 2000). This research has generally found that students receiving federal need-based aid are less likely to persist than students not receiving federal need-based aid. Need-based aid is also an important indicator of student parental income level, which is also negatively correlated with retention. For example, after controlling for student background characteristics, the National Center for Educational Statistics found that low income students who began their postsecondary education in 1995-1996 were less likely than non-low income students to attain a degree (Choy, 2000).

This research suggests that having a high number of students receiving need-based financial aid would have a significant impact on that institution's retention and graduation rates. This variation was controlled for using data from IPEDS and the US Department of Education's survey on the distribution of Pell Grant funding by institution. Using these two data sources, a percentage of full and part-time students receiving Pell Grant aid was calculated for each institution used in this study. Ideally, this data would have allowed for the calculation of the percentage of incoming freshmen receiving Pell Grant aid. The data, however, only allowed for the calculation of the percentage of the overall student body which received Pell Grant aid. It was determined that the percentage of the overall student body receiving Pell Grant aid would likely be strongly correlated with the percentage of new students receiving Pell Grant aid.

Table 3.1 provides a summary of each dependent and independent variable used in this study. In addition to the variable name, the table provides a definition of each variable and a brief description of the operationalization of each variable.

Data Analysis

Statistical analysis of the aforementioned variables was conducted using ordinary least squares (OLS) regression. For research questions examining the association between structural racial diversity and freshmen retention rates, OLS models examining institution i's retention rate for cohort j[12] after their freshmen year (FR_{ij+1}) as a function of institution i's undergraduate racial diversity in year j (D_{ij}), institutional characteristics in year j (IC_{ij}), cohort j's entry characteristics (CC_{ij}), and an institutional disturbance term (μ_i) were estimated. The mathematical notation of this model was:

[12] Each cohort is labeled by year.

Table 3.1: Description of Variables

Variables	Data Source	Description
Dependent Variables		
Institution Graduation Rate	IPEDS Graduation Rate	The six-year graduation rate (percentage) of a college/university
Race-specific Graduation Rate		
Freshmen Retention	IPEDS Enrollment Survey	The freshmen retention rate of a college/university measured as the percentage of student returning after their freshmen year
Independent Variables (institutional characteristics)		
Structural Racial Diversity	IPEDS Enrollment Survey	Institutional diversity index score based on the percentage of Asian, African American, Caucasian, and Hispanic/Latino students in the undergraduate student body.
Institution Size	IPEDS Enrollment Survey	Total full-time undergraduate enrollment of a college/university
Institutional Expenditures on Academic Support Services	IPEDS Finance Survey	Expenditures per full-time undergraduate student for academic support services
Institutional Expenditures on Student Support Services	IPEDS Finance Survey	Expenditures per full-time undergraduate student for student support services
Institutional Control	IPEDS Institutional Characteristics Survey	Dichotomous measure of institutional control of a college/university (1=Public; 2=Private)
Institution Location	IPEDS Institutional Characteristics Survey	The degree of urbanization of an institution's location (1=City; 2=Suburb; 3=Town; 4=Rural)
Institution Type	IPEDS Institutional Characteristics Survey	Institutional type according to Carnegie Classification (1=Research University; 2=Master's College and University; 3= Baccalaureate Colleges)
Institutional Cost	IPEDS Institutional Characteristics	Average room, board, tuition, and fees for in-state students at a college/university

Table 3.1, continued

Variables	Data Source	Description
Institutional Selectivity	Barron's Profile of American Colleges	Using Barron's data, institutions are placed into one of six categories based on the level of institutional competiveness of admission (1=Noncompetitive; 2=Less Competitive; 3=Competitive; 4=Very Competitive; 5=Highly Competitive; 6=Most Competitive)
Commuter School	Carnegie Classification of Colleges/Universities	Categorical measure based on the percentage of students living on campus (1=Primarily Commuter; 2=Primarily Non-Commuter; 3=Highly Non-Commuter)
Percent of Student Body Receiving Federal Pell Grant Aid	IPEDS Institutional Characteristics Survey US Department of Education Pell Grant Distribution Data	Percent of an institution's undergraduate student body receiving Federal Pell Grant aid
	Independent Variables (cohort characteristics)	
Percent Minority of Freshmen Class	IPEDS Enrollment Survey	Percent of freshmen in an incoming cohort who are racial minorities at a college/university
Percent Male of Incoming Class	IPEDS Enrollment Survey	Percent of freshmen in an incoming cohort who are male at a college/university

$$FR_{ij+1} = \beta_0 + \beta_1 D_{ij} + \beta_2 IC_{ij} + \beta_3 CC_{ij} + \mu_i \quad (2)$$

This model was estimated separately for each cohort of students in an attempt to obtain an understanding of the relationship between student body racial diversity and institutional graduation rates over several years. Therefore, equation 2 was estimated 5 times beginning with the 2003 cohort and ending with the 2007 cohort.

Given the longitudinal nature of the data collected for this study, the robustness of equation 2 was checked using an OLS model with year and institutional fixed effects. Despite the efforts taken in this study to control for any variable which could be correlated with both student body racial diversity and institutional freshmen retention rates, the estimation of OLS models using cross-sectional data as done in equation 2 is subject to possible omitted variable bias from observable and unobservable institutional characteristics. For example, some institutions may engage in high quality "retention building" activities such as living-learning communities and orientation programs which cannot be controlled for in equation 2. The estimation of equation 2 may also fail to control for what scholars have described as "institutional openness to diversity". Among scholars studying racial diversity in higher education, it has been proposed that for institutions of higher education to realize the benefits of diversity, colleges and universities must create and promote a culture which fosters an openness to diversity within their institutional environment (Hurtado, et al., 2003; Milem, et al., 2005). This "culture" is very difficult to measure and therefore would be difficult to control for in any cross-sectional regression model.

In order to examine whether these or other non-controllable characteristics significantly impact the relationship between student body racial diversity and

institutional retention rates, a second OLS regression using institutional and year fixed effects was used. The mathematical notation of this model was:

$$FR_{ij+1} = \beta_0 + \beta_1 D_{ij} + \beta_2 IC_{ij} + \beta_3 CC_{ij} + \gamma i + \eta t + \mu_i \quad (3)$$

Equation 3 was run using a five-year panel data set constructed using institutional data from the 2003 through 2007 freshmen cohorts. In equation 3, $FR_{ij+1,}$ $D_{ij,}$ $IC_{ij,}$ and CC_{ij} are measured the same way they are measured in equation 2. The primary difference between the two models is the institutional fixed effect (γi) and time fixed effect (ηt). The institutional fixed effect γi controls for characteristics, both observable and unobservable, of a college or university that do not change over the period covered in this study. The time fixed effect ηt controls for national trends that effect all institutions of higher education in a given year. Therefore, variables included in equation 2 which do not vary over time such as institutional control, location, type, selectivity, and residentiality are not included in equation 3 because they are absorbed by the fixed effects estimator. This methodology controls for unobservable characteristics such as institutional culture and institutional quality which are not easily measurable and therefore are omitted in equation 2[13]. If the findings regarding the relationship between student body racial diversity and freshmen retention rates differ significantly in the fixed effects and non-fixed effects models, it suggest that non-measureable organizational characteristics play a significant role in this relationship. In that case, use of the fixed effects model would provide a more valid estimate of the influence of student body racial diversity on freshmen retention rates.

[13] This is assuming that these characteristics have not changed over the time period studied in this dissertation. Given the notoriously slow rate at which large organizations change, however, it is safe to assume that many characteristics of colleges and universities did not significantly change over the time period studied.

Variations of equations 2 and 3 were run to address each of the study's research questions. For research questions 2 and 3, variable interactions were included in the aforementioned models to examine whether the relationship between structural racial diversity and freshmen retention rates is conditional on institution type or enrollment size.

The methods used to explore the effect of student body racial diversity on six-year graduation rates were similar to those used to examine freshmen retention rates. Institution i's graduation rate for cohort j after 5 years (GR_{ij+5}) was examined as a function of institution i's undergraduate racial diversity over years j+5 (D_{ij+5}), institutional characteristics over years j+5 (IC_{ij+5}), cohort j's entry characteristics (CC_{ij}), and an institutional disturbance term (μ_i). The mathematical notation of this model was:

$$GR_{ij+5} = \beta_0 + \beta_1 D_{ij+5} + \beta_2 IC_{ij+5} + \beta_3 CC_{ij} + \mu_i \quad (4)$$

Again, this model was initially estimated separately for each cohort of students in an attempt to uncover the relationship between student body racial diversity and six-year graduation rates over several years. Therefore, equation 4 was estimated 12 times beginning with the 1991 cohort and ending with the 2002 cohort.

Measures of student body racial diversity used in equation 4 represent the mean institutional value for that variable over the six years in which a cohort could have been enrolled in an institution. For example, in the model estimated for the 1991 cohort, student body diversity (D_{ij+5}) was an institution's average institutional racial diversity index score from 1991-1996. For the 1992 cohort, student body diversity (D_{ij+5}) is an institution's average institutional racial diversity index score from 1992-1997, and so forth.

This same strategy is used for institutional characteristics which change from year to year. Institutional size, institutional expenditures, and average tuition are each measured in equation 4 using the mean institution value over the period in which a cohort was enrolled. For institutional characteristics which do not change over time such as institutional control, location, type, selectivity, and commuter school, the measures used in equation 4 were taken from the first year in which the cohort enrolled. Cohort specific characteristics (percent Minority of incoming class, percent male of incoming class, and percent of incoming class receiving Pell Grant) were also taken from the first year in which the cohort enrolled.

To test the validity of the OLS model estimated in equation 4, a fixed effects model of the following form was estimated:

$$GR_{ij+5} = \beta_0 + \beta_1 D_{ij+5} + \beta_2 IC_{ij+5} + \beta_3 CC_{ij} + \gamma i + \eta t + \mu_i \quad (5)$$

Equation 5 was run using a twelve year panel data set constructed using institutional data from the 1991 through 2002 freshmen cohorts. As noted earlier, the primary difference between the fixed effects and non-fixed effects model is the inclusion of γi and ηt. These variables (γi and ηt) allow for the controlling of non-changing institutional characteristics which may introduce omitted variable bias. As with equations 2 and 3, equations 4 and 5 were also modified to include several interaction terms in order to address whether the association between structural racial diversity and six-year graduation rates is conditional on institutional type and size. Equations 4 and 5 were also ran using race-specific six-year graduation rates as dependent variables in order to address research question 7 which asks whether the influence of structural diversity on an institution's six-year graduation rate is different for specific racial groups.

Limitations

A few limitations of this study's design may temper the results and implications that can be drawn from this research. One of these is that the measure used to control for institutional selectivity and residentiality do not allow for institutions to change over time. While it is possible that over the years studied some institutions of higher education became more or less selective and/or residential, evidence suggest that this is unlikely to be the case for most American colleges and universities. A second limitation involves the reporting of institutional statistics to IPEDS and the Carnegie Foundation. The validity of the statistical estimations reported in this study is directed related to the accuracy of the statistics reported by institutions of higher education. If these institutions systematically report inaccurate statistics, the findings of this study may be compromised. Validity would especially be compromised if the non-reporting or inaccurate reporting of data were endogenous to the models used. Third, the omission of important control variable in both the fixed effects and non-fixed effects models may limit the validity of this study. While the regression models used in this study account for most of the institutional characteristics known to have an impact on institutional retention and graduation rates, there may be some characteristics not controlled for in the models used. If these variables are also correlated with structural diversity, omitted variable bias may limit the validity of this study. A thorough examination of literature on college student retention, however, indicates that this is unlikely. A fourth limitation is related to the redistribution of "race unknown" students into various race specific categories. If this redistribution creates an inaccurate portrayal of an institution's true student body racial diversity, it could call into question the validity of the study's findings.

Other study limitations may reduce the generalizability and ability to compare the findings of this study. Though this study examines all colleges and universities within a certain population of higher education institutions, these institutions do not make up the whole of American higher education. Therefore, the findings of this study are generalizable only to American, four-year, not-for-profit, non-special focus institutions of higher education with Carnegie Classifications as research universities, master's colleges and universities, and baccalaureate colleges. Because institutions with very small entering classes were dropped, the generalizability of these findings is also limited to institutions with average freshmen enrollments of over 100 students. Finally, because the same cohorts of students are not used for the analysis of graduation rates and retention rates, it is difficult to compare the findings of these two analyses.

Another important limitation of this study to note is related to the fact that the observational data employed does not allow for the determination of a causal relationship between student body racial diversity and institutional retention and graduation rate. Despite the use of extensive control variables and fixed effects estimations, the design limitations of this study prevent the identification of causal effects among the variables of interest in this study.

Chapter Summary

As debate among practitioners and policy makers over the use of Affirmative Action in college/university admissions continues, scholars in recent years have continued to engage in research examining the educational impact of diversity on various educational outcomes. This study contributes to this body of research by examining the

relationship between undergraduate student body racial diversity and institutional freshmen retention and six-year graduation rates. The study provides institutional policy makers and others in the higher education community with important information for better understanding the organizational impact of student body racial diversity.

Chapter III detailed the theoretical framework and the methodology used to engage in this study. The chapter began with a description of two theories (social categorization theory and similarity-attraction theory) and one concept (residentiality) which served as the theoretical lens from which this study's hypotheses were based. This was followed by a detailing of the hypotheses generated for each of the seven research questions as implied from both previous research and organizational theory. The methodology of the study was then discussed beginning with how the colleges and universities used in this study were selected followed by a discussion of the variables used and the data analysis techniques employed. Given the size of the analytic groups used in this study, it is believed that this study has very strong generalizability among the population of four-year, not for-profit institutions of higher education in the United States. Given the statistical estimation techniques used, it is also believed that this study provides an estimation of the relationship between student body racial diversity and institutional ability to retain students that is as valid as possible given the available data. The use of interactions and race-specific dependent variables provides for a more nuanced understanding of this relationship than what has been previously examined. The remainder of this dissertation presents the findings of this research.

CHAPTER IV

DATA ANALYSIS AND RESULTS

STUDENT BODY RACIAL DIVERSITY AND FRESHMEN RETENTION

This chapter describes the results of the data analyses used to address research questions one through three of this study[14]. These questions were:

1. Controlling for other factors, what is the relationship between structural diversity (a measure of student body racial composition) and an institution's freshmen retention rate?
2. Controlling for other factors, is the relationship between structural diversity and institutional freshmen retention rates conditional on institutional type (i.e., Carnegie Classification, residential vs. non-residential, public vs. private, etc) or institutional enrollment size?
3. Controlling for other factors, is the relationship between structural diversity and institutional freshmen retention rates different for Predominantly White Institutions and Minority-Serving Institutions?

Each of these questions addressed the relationship between student body racial diversity and freshmen retention rates. The chapter is divided into three parts. In the first section, a description of the data cleaning techniques used to correct or remove inaccurate/incomplete data is presented. This is followed by a descriptive analysis of the variables used in this study. The chapter concludes with a presentation of the results of

[14] Chapter V addresses research questions four through seven.

regression analyses used to test the influence of student body racial diversity on institutional freshmen retention rates.

Data Cleaning

As noted in chapter three, the original analytic group for research questions pertaining to the association between diversity and retention consisted of 1,242 colleges and universities. Upon reviewing data from these institutions, however, it was noticed that significant inaccuracies and missing data existed. Because these incomplete and inaccurate data could lead to biased multivariate analyses, additional data cleaning was conducted to ensure that the most valid data possible was used for regression analyses.

This data cleaning process began by dropping institutions which did not report their institutional freshmen retention rate to IPEDS between 2004 and 2008. Any institution which did not report their retention rate in 3 or more of the 5 years used in this study was dropped[15]. In addition, due to the devastation of Hurricane Katrina in 2005 and the resulting fluctuation in student enrollment for schools in New Orleans, all institutions located in the city of New Orleans were dropped. Institutions which did not report the racial composition of their student body were also dropped using the same criteria used for dropping schools without retention rate data (if more than two years of data were missing, the school was dropped)[16].

The second step in the data cleaning process was to account for missing and clearly inaccurate control variables. A variety of methods were used to correct these

[15] This was done in order to ensure the creation of as balanced a dataset as possible when running fixed effects models.

[16] A review of the missing data suggested that the non-reporting of retention rates and student body racial diversity appeared to be completely random and exogenous to the models used in this study.

errors. In situations where institutional data were missing or incorrect for only one or two years, missing year's data were imputed using existing institutional data. For example, if an institution was missing one year of tuition data, that variable was calculated as the mean of that institution's tuition rate in the year before and the year after that missing year. In situations where several years of data were missing or inaccurate, institutions' websites and other college guides were used to find correct information. Finally, in situations where neither of the above techniques produced accurate data, mean substitution was used. For example, if accurate information on the number of Pell Grant recipients at a research institution could not be found, the mean percentage of Pell Grant recipients in a given year for research institutions in this dataset was used for the institution where information could not be found. Fortunately, this method was only needed in the case of two variables (Institutional Expenditures on Student Support Services and Percentage of Student Body Receiving Federal Pell Grant Aid) at less than 15 institutions. Given this very small percentage, it is not believed that using mean substitution significantly changed the outcomes of the regression analyses ran[17].

Imputation and mean replacement were used to account for missing and inaccurate data on control variables only. In situations where retention rate (the dependent variable) or student body racial diversity (the independent variable of interest) was missing or clearly inaccurate for a given year, the information was left as missing. Therefore, in both cross-sectional and panel regression analyses, these years were dropped from the analysis.

[17] While mean substitution and imputation are not ideal for a number of reasons, including the reduction of variance in variables and biased correlations among variables, it is not believed that using mean substitution significantly changed the outcomes of the regression analyses ran.

After using these data cleaning techniques, a final group (Final Retention Rate Group) of 1,215 institutions remained and was used for this study. This group consisted of 243 Research colleges and universities, 532 Master's colleges and universities, and 440 Baccalaureate colleges. Though smaller than the original analytic group, this final group of institutions still represent around 75% of all four-year, nonprofit, non-special focus colleges and universities in the United States according to the 2008 Almanac edition of *The Chronicle of Higher Education* (Almanac of Higher Education, 2008).

Descriptive Analyses

Table 4.1 displays summary statistics for each of the variables used in this study by year. In examining the outcome variable, it is noted that from 2004 to 2008 the mean freshmen retention rate of institutions in this study remained relatively stable. The highest overall mean retention rate occurred in 2004 (76%) while the lowest rate occurred in 2006 (75.33%). This stability is consistent with the findings of previous research which has found institutional retention and graduation rates to have remained relatively stable over the past several years (Tinto, 1982). In looking at structural racial diversity, one observes a relatively small change over the years. Student body racial diversity from 2004 to 2008 has ranged from a score of 67.54 to 68.50. This modest one point increase in diversity appears relatively small in comparison to the amount of higher education discourse centered on diversifying college and universities student bodies.

Other summary statistics show gradual increases in institutional size, expenditures, and cost. Each of these was expected given the current trends in American higher education. The percentage of an institution's student body receiving Pell Grant

aid, however, decreased from 2004 to 2008. This reflects a trend noted by The College Board that total Pell Grant funding has begun to decline in recent years (The College Board., 2006). With regard to institutional cohort characteristics, mean values appear to have increased from 2004 to 2008. The mean percentage of male students in an incoming class increased slightly while the mean percentage of minorities in institutional freshmen classes increased around 3%. This 3% percent increase over 5 years is a fairly large in comparison to the relative stability of overall institutional student body diversity rates. These findings could reflect that fact that institutions are making some strides in racially diversifying their student body with regard to incoming freshmen but may be having trouble retaining this diversity over subsequent years.

Table 4.2 displays frequency statistics for non-changing categorical variables. The majority of schools used for this study are private institutions. With regard to location, most institutions in this study are located in areas classified as cities or suburbs with very few institutions located in rural areas. Master's colleges and universities are the most prominent type of institution in this dataset followed by baccalaureate colleges then research universities. There was a fairly even distribution of institutions among commuter types with around 43% being highly non-commuter, 34% being primarily non-commuter, and 23% being primarily commuter.

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then Research universities. There was a fairly even distribution of institutions among commuter types with around 43% being highly non-commuter, 34% being primarily non-commuter, and 23% being primarily commuter.

With regard to selectivity, the distribution of institutions appears to be concentrated in the center. The majority of schools in this study were either less competitive, competitive, or very competitive institutions. Towards the tails, you see that less than 100 institutions fall into the category of non-competitive and less than 120 institutions would be considered highly competitive and most competitive. This distribution indicated that, though they often receive the most attention in the media, very selective colleges make up only a small percentage of American higher education. The majority of higher education institutions are moderately to less selective.

Tables 4.3 and 4.4 display overall summary statistics and frequency distributions for each variable by institutional type. Among the institutions studied, research universities had the highest freshmen retention rates, were the most racially diverse with regard to both overall structural racial diversity and freshmen racial diversity, and had by far the largest student enrollments. Research universities were also found to be primarily public, located in cities, and had higher expenditures per student on academic support services. Master's colleges and universities had the lowest freshmen retention rates, spent the least on academic support services, and had the highest percentage of its student body receiving Pell Grant aid. Baccalaureate colleges were the least racially diverse, were the most expensive, and were mostly private institutions. Baccalaureate colleges were also, as expected, the most residential in that nearly 70% of these institutions were highly non-commuter.

Table 4.1: Means and Standard Deviations for Continuous Variables by Year

Variable Name	2004	2005	2006	2007	2008	Total
Freshmen Retention	76.00	75.77	75.33	75.40	75.51	75.60
	(10.82)	(10.92)	(11.01)	(11.34)	(11.20)	(11.06)
Structural Racial Diversity	67.54	67.72	67.91	68.19	68.50	67.97
	(7.511)	(7.507)	(7.516)	(7.551)	(7.627)	(7.548)
Institution Size	4607.2	4689.7	4766.3	4823.5	4907.2	4758.7
	(5451.9)	(5502.1)	(5600.8)	(5676.9)	(5783.6)	(5603.4)
Institutional Expenditures on Academic Support Services	2740.5	2869.3	3003.7	3168.1	3391.6	3034.5
	(4316.2)	(4600.3)	(4882.4)	(5179.0)	(5812.9)	(4987.9)
Institutional Expenditures on Student Support Services	2955.2	3125.1	3307.2	3505.7	3725.5	3323.6
	(2369.1)	(2608.0)	(2758.7)	(2855.6)	(3030.7)	(2746.1)
Institutional Cost	18886.0	19996.1	21172.5	22438.6	23745.4	21246.7
	(9222.1)	(9712.7)	(10246.3)	(10839.0)	(11464.2)	(10465.9)
Percent of Student Body Receiving Federal Pell Grant Aid	31.82	31.57	29.90	29.60	29.90	30.56
	(15.74)	(15.94)	(15.65)	(15.57)	(15.27)	(15.66)
Percent Minority of Freshmen class	24.73	25.29	25.80	26.61	27.23	25.93
	(24.37)	(24.24)	(24.41)	(24.31)	(24.47)	(24.37)
Percent Male of Incoming Class	43.08	43.21	43.42	43.65	43.77	43.43
	(12.47)	(12.43)	(12.39)	(12.32)	(12.07)	(12.34)

Table 4.2: Frequencies for Categorical Variables

Variable Name	Frequencies
Institutional Control	Public: 477
	Private: 738
Institution Location	City: 574
	Suburb: 304
	Town: 270
	Rural: 67
Institution Type	Research: 243
	Master's: 532
	Baccalaureate: 440
Institutional Selectivity	Non Comp: 77
	Less Comp: 247
	Comp: 532
	Very Comp: 241
	High Comp: 67
	Most Comp: 51
Commuter School	Prim Com: 285
	Prim Non-Com: 412
	High Non-Com: 518

Table 4.3: Means and Standard Deviations for Continuous Variables by Carnegie Type

Variable Name	Research (n=243)	Master's (n=532)	Bac (n=440)
Freshmen Retention	82.50 (9.920)	73.64 (8.816)	74.16 (12.51)
Structural Racial Diversity	71.46 (7.915)	68.15 (7.734)	65.83 (6.253)
Institution Size	11781.8 (7674.6)	4160.2 (3573.8)	1598.3 (1016.9)
Institutional Expenditures on Academic Support Services	6131.7 (10049.1)	2197.6 (1629.2)	2333.8 (1750.5)
Institutional Expenditures on Academic Support Services	6131.7 (10049.1)	2197.6 (1629.2)	2333.8 (1750.5)
Institutional Expenditures on Student Support Services	3325.8 (4562.0)	2779.3 (1839.0)	3980.7 (2109.9)
Institutional Cost	20463.9 (12214.1)	18800.2 (9295.6)	24638.8 (9828.3)
Percent of Student Body Receiving Federal Pell Grant Aid	24.70 (12.54)	32.14 (13.65)	31.88 (18.47)
Percent Minority of Freshmen class	29.45 (20.32)	26.59 (24.76)	23.18 (25.62)
Percent Male of Incoming Class	47.69 (9.421)	41.04 (11.23)	43.96 (14.20)

Table 4.4: Frequencies for Categorical Variables by Carnegie Type

Variable Name	Research (n=243)	Master's (n=532)	Bac (n=440)
Institutional Control	Pub: 161	Pub: 254	Pub: 62
	Priv: 82	Priv: 278	Priv: 378
Institution Location	City: 166	City: 257	City: 151
	Sub: 41	Sub: 136	Sub: 127
	Town: 31	Town: 117	Town: 122
	Rural: 5	Rural: 22	Rural: 40
Commuter School	Prim Com: 81	Prim Com: 165	Prim Com: 39
	Prim Non-Com: 96	Prim Non-Com: 218	Prim Non-Com: 98
	High Non-Com: 66	High Non-Com: 149	High Non-Com: 303
Institutional Selectivity	Non Comp: 7	Non Comp: 38	Non Comp: 32
	Less Comp: 20	Less Comp: 133	Less Comp: 94
	Comp: 90	Comp: 279	Comp: 163
	Very Comp: 73	Very Comp: 74	Very Comp: 94
	High Com 23	High Com 8	High Com 36
	Most Comp: 30	Most Comp: 0	Most Comp: 21

Tables 4.5 and 4.6 display the amount of change in the variables used in this study over the 5 years in which data were collected. The first column in Table 4.5 displays the average standard deviation in each variable from 2004-2008 while column two shows the average difference in the lowest and highest value for each variable from 2004-2008. Overall, the average institution of higher education over this time period saw a 2.87% change in their freshmen racial diversity peer year. The average institution also saw a 7.06% change in their highest and lowest freshmen retention rate with around 70% of institutions experiencing a change of between 2% and 12%. In looking at the independent variable of interest in this study, the average institution experienced a less than 1 point change in their structural racial diversity score from 2004-2008. This statistic, along with the fact that institutions only experienced a 1.76 point difference between minimum and maximum scores with regard to structural racial diversity, suggest that the diversification of college and university student bodies is happening at a fairly slow rate.

In looking at variable changes by institutional type, there appear to be significant differences. With regard to freshmen retention rates, the most change over this 5-year stretch appears to have occurred at Master's and Baccalaureate institutions. Master's and Baccalaureate institutions also appear to have experienced the most change in student body racial diversity. As noted in Table 4.6, the mean difference between the highest and lowest freshmen retention rates are 6.89 and 8.90 for Master's and Baccalaureate institutions, respectively. Both of these are higher than the 4.10 mean difference at Research institutions. One-way ANOVA analysis and a Bonferroni post-hoc test revealed that these differences are statistically significant, $F(2, 1212) = 73.19$, $p = .000$.

Research universities also had statistically significant lower rates of change with regard to structural racial diversity and percent Minority of freshmen class than Master's and Baccalaureate institutions[18]. Given that most Research institutions are public institutions and the fact that in recent years many states have prohibited the use of affirmative action in college admissions (Jaschik, 2010), these results are not surprising. Statistical variation among the other variables also produced expected results.

The descriptive statistics presented in Tables 4.1-4.6 indicated the importance of including several covariates in this analysis of the relationship between student body racial diversity and institutional retention. The data shows consistent differences among the institutions analyzed with regard to type, selectivity, enrollment size, etc. Therefore, it is important to control for these variables if the goal is to obtain an unbiased estimate of the relationship between diversity and student retention. These descriptive statistics also suggested that in the fixed effects regression model estimations, the influence of diversity on student retention rates would be small. This is due to the lack of variance in institutional freshmen retention rates over the five years studied.

[18] ANOVAs revealed a statistically significantly difference between Research universities and Master's/ Baccalaureate in average standard deviation and average difference between minimum and maximum score with regards to structural racial diversity and percent Minority of incoming class.

Table 4.5: Variable Change from 2004-2008

Variable Name	Average Standard Deviation from 2004-2008	Average Difference between Min and Max Score 2004-2008
Freshmen Retention	2.872 (2.102)	7.057 (5.277)
Structural Racial Diversity	0.721 (0.578)	1.759 (1.378)
Institution Size	197.3 (256.6)	484.6 (633.3)
Institutional Expenditures on Academic Support Services	385.9 (852.3)	939.9 (2082.3)
Institutional Expenditures on Student Support Services	416.0 (543.1)	1004.8 (1288.3)
Institutional Cost	1979.7 (1034.2)	4951.0 (2563.3)
Percent of Student Body Receiving Federal Pell Grant Aid	1.984 (1.914)	4.743 (4.437)
Percent Minority of Freshmen class	2.423 (1.650)	5.950 (4.040)
Percent Male of Incoming Class	2.458 (1.724)	6.029 (4.186)

Notes: Standard Deviations in parentheses

Table 4.6: Variable Change from 2004-2008 by Carnegie Type

	Average Standard Deviation from 2004-2008			Average Difference between Min and Max Score 2004-2008		
	Research Universities	Master's Colleges	Bac Colleges	Research Universities	Master's Colleges	Bac Colleges
Freshmen Retention	1.694 (1.406)	2.813 (1.795)	3.594 (2.436)	4.095 (3.516)	6.885 (4.472)	8.900 (6.140)
Structural Racial Diversity	0.629 (0.587)	0.710 (0.576)	0.784 (0.568)	1.545 (1.409)	1.727 (1.370)	1.914 (1.355)
Institution Size	392.0 (354.8)	206.3 (240.0)	78.91 (88.72)	961.9 (870.4)	509.1 (599.7)	191.3 (208.2)
Institutional Expenditures on Academic Support Services	819.7 (1742.2)	276.3 (298.3)	278.9 (313.0)	2010.2 (4290.5)	672.4 (685.9)	672.2 (694.2)
Institutional Expenditures on Student Support Services	442.0 (854.9)	344.3 (367.1)	488.3 (487.8)	1085.9 (2143.1)	827.0 (803.7)	1174.8 (1098.1)
Institutional Cost	1927.0 (1169.0)	1791.0 (987.7)	2236.9 (955.6)	4819.3 (2885.2)	4464.0 (2408.9)	5612.4 (2413.8)
Percent of Student Body Receiving Federal Pell Grant Aid	1.463 (1.332)	2.022 (1.942)	2.227 (2.093)	3.440 (2.970)	4.815 (4.478)	5.377 (4.897)
Percent Minority of Freshmen class	1.974 (1.156)	2.561 (1.744)	2.503 (1.723)	4.854 (2.848)	6.272 (4.244)	6.165 (4.247)
Percent Male of Incoming Class	1.467 (0.826)	2.386 (1.579)	3.092 (1.968)	3.583 (1.968)	5.806 (3.730)	7.649 (4.847)

Notes: Standard Deviations in parentheses

Regression Analyses

Regression analyses began with the establishment of a level of statistical significance to be used to identify significant relationships between variables. The conventional .05 significance level was selected to identify significant relationships while relationships at the .01 and .001 levels were also separately identified. The distribution of variables used in this study was then examined. In order to ensure the linearity of the relationship between this study's dependent variable (freshmen retention rates) and independent variables, it is important that the distribution of independent variables not be extremely skewed. This analysis revealed that several of the study's control variables were not normally distributed. To account for this, log transformations of 4 variables (Institutional Cost, Institutional Size, Institutional Expenditures on Academic Support Services, Institutional Expenditures on Student Support Services) were performed. Log transformations for other control variables (Percent of Student Body Receiving Federal Pell Grant Aid, Percent Minority of Freshmen Class, Percent Male of Freshmen Class) were not performed because each of these variable contained values of zero[19]. Fortunately, none of these variables varied significantly from normal distribution. The independent variable of interest (Structural Racial Diversity) also did no deviate significantly from normal distribution.

Table 4.7 displays the results of the first set of regressions ran to examine the influence of structural racial diversity on freshmen retention rates for each year in which data were collected. Several interesting relations can be seen in this table. Across the years, institutional cost, institutional size, and institutional expenditures on academic support services were positively correlated with freshmen retention rates. Two of these

[19] Log Transformations can only be allowed to numbers above 0.

Table 4.7: OLS Regressions per Year

	2004	2005	2006	2007	2008
Structural Racial Diversity	-0.02 (0.04)	0.02 (0.04)	-0.02 (0.04)	-0.03 (0.04)	-0.00 (0.04)
Institutional Cost (Logged)	3.44*** (0.98)	4.90*** (1.08)	3.85*** (0.96)	4.09*** (1.05)	4.95*** (1.14)
Institution Size (Logged)	4.35*** (0.41)	4.64*** (0.41)	4.28*** (0.38)	4.62*** (0.43)	3.83*** (0.42)
Instit Expenditures on Academic Support Services (Logged)	2.14*** (0.38)	2.03*** (0.37)	1.79*** (0.39)	1.47*** (0.40)	1.03* (0.44)
Instit Expenditures on Student Support Services (Logged)	0.78 (0.52)	0.67 (0.47)	0.75 (0.49)	0.81 (0.52)	0.11 (0.55)
Percent of Student Body Receiving Federal Pell Grant Aid	-4.68*** (0.61)	-4.84*** (0.72)	-5.45*** (0.63)	-4.77*** (0.67)	-5.21*** (0.91)
Percent Minority of Freshmen Class	-0.01 (0.01)	-0.03* (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.03* (0.01)
Percent Male of Freshmen Class	-0.08*** (0.02)	-0.07*** (0.02)	-0.08*** (0.02)	-0.06*** (0.02)	-0.07** (0.02)
Control-Private	-0.15 (1.05)	-1.18 (1.04)	-0.92 (0.94)	-0.36 (0.96)	-1.47 (1.07)
Location-Suburb	0.34 (0.46)	0.49 (0.43)	0.53 (0.45)	1.11* (0.46)	-0.01 (0.45)
Location-Town	-0.73 (0.50)	-0.19 (0.48)	-0.64 (0.48)	0.04 (0.54)	-0.91 (0.56)
Location-Rural	-0.00 (0.83)	0.19 (0.84)	-0.20 (0.87)	-0.72 (0.81)	-1.35 (0.82)
Type-Master's	1.67** (0.61)	2.34*** (0.61)	1.28* (0.61)	1.45* (0.63)	0.62 (0.67)
Type-Bac	1.87* (0.78)	2.22** (0.76)	1.15 (0.78)	0.87 (0.83)	0.55 (0.84)
Prim Non-Com	2.10*** (0.53)	2.01*** (0.54)	1.97*** (0.54)	1.32* (0.57)	1.50** (0.57)
Highly Non-Com	3.90*** (0.69)	3.92*** (0.72)	3.85*** (0.71)	3.38*** (0.73)	3.12*** (0.73)
Select-Less Comp	1.61 (1.05)	0.44 (0.95)	0.91 (0.87)	0.72 (1.06)	0.31 (1.03)

Table 4.7, continued

	2004	2005	2006	2007	2008
Select-Comp	3.92*** (1.01)	2.78** (0.89)	2.66** (0.82)	2.90** (1.01)	2.86** (0.97)
Select-Very Comp	8.16*** (1.10)	6.33*** (1.02)	6.75*** (0.93)	7.85*** (1.08)	7.48*** (1.08)
Select-Highly Comp	11.73*** (1.27)	10.06*** (1.20)	10.81*** (1.13)	11.65*** (1.25)	11.12*** (1.30)
Select-Most Comp	12.58*** (1.45)	10.80*** (1.35)	11.75*** (1.33)	13.02*** (1.44)	13.69*** (1.54)
Constant	-1.75 (9.27)	-18.25 (10.17)	0.79 (9.38)	-5.49 (9.74)	2.77 (11.91)
R-squared	0.680	0.700	0.705	0.688	0.676
N	1214	1211	1215	1214	1210

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Mean VIF across models ranged from 3.03 to 3.08
Omitted Categories: Public, City, Research Universities, Prim Commuter, & Non-Selective
Dependent Variable: Overall Institution Freshmen Retention Rates

were expected, given that previous research has found that more expensive institutions and institution with more resources to spend have lower student dropout (Gansemer-Topf & Schuh, 2006; Nora & Cabrera, 1996). The Betas (β) for institutional size, however, were unexpected given that previous research has suggested that smaller institutions have higher retention rates (Pascarella & Terenzini, 1991). Among the continuous variables which had a negative correlation with freshmen retention rates across the years were percent of student body receiving federal Pell Grant aid and the percentage of males in the freshmen class. Given previous research which has found that students from poorer socio-economic background and male students have higher probabilities of dropping out, it was expected that institutions which enroll greater numbers of these students would have lower freshmen retention rates.

Among the categorical variables, several were found to have a significant relationship with freshmen retention rates. Primarily commuter institutions were found to have significantly lower freshmen retention rates than primarily non-commuter and highly non-commuter institutions. Selectivity also appeared to play a significant role in freshmen retention rates. While there was no difference in the retention rates of non-competitive and less competitive institutions, non-competitive institutions had significantly lower freshmen retention rates than competitive, very competitive, highly competitive, and most competitive institutions. In all years except one, Master's colleges had significantly higher freshmen retention rates than Research universities.

In examining the coefficient for structural racial diversity, the results of these models suggests that the racial diversity of undergraduates is not significant related to an institution's ability to retain freshmen.

Table 4.8: Fixed Effects Model

	β	Robust Standard Error
Structural Racial Diversity	0.19*	(0.09)
Institutional Cost (Logged)	-0.21	(0.77)
Institution Size (Logged)	-2.87*	(1.34)
Institutional Expenditures on Academic Support Services (Logged)	0.061	(0.32)
Institutional Expenditures on Student Support Services (Logged)	0.52	(0.53)
Percent of Student Body Receiving Federal Pell Grant Aid	-0.99	(0.70)
Percent Minority of Freshmen Class	-0.12***	(0.03)
Percent Male of Freshmen Class	-0.16***	(0.02)
Year 2005	-0.15	(0.16)
Year 2006	-0.57**	(0.21)
Year 2007	-0.44	(0.27)
Year 2008	-0.29	(0.35)
Constant	96.2***	(16.31)
N	6064	
Groups	1215	
R-squared	0.92	
rho	.910	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Freshmen Retention Rates

In each year of analysis, beta coefficients ranged from -.02 to .02 with robust standard errors consistently around .04. In no year was the coefficient for structural racial diversity statistically significant.

These findings would suggest that, controlling for other factors, student body racial diversity has no significant influence on institutional freshmen retention rates. As mentioned earlier, however, these results could be tainted by omitted variable bias in the OLS models using cross-sectional data. Given the longitudinal nature of the dataset created for this study, it was possible to examine the robustness of the yearly OLS estimates using a fixed effects regression model. The results of this estimation are in Table 4.8. One beta coefficient, percent male of freshmen class, remains negative and statistically significant. A one unit increase in the percentage of male students in an institution's freshmen class is associated with a .16 point decrease in the freshmen retention rate of that cohort.

Other beta coefficients were found to be different in the yearly OLS models and the fixed effects model. The fixed effects model shows percent Minority of freshmen class to have a statistically significant association with freshmen retention rates (β = -12, p=.000). This negative relationship between freshmen Minority enrollment and freshmen retention rates was only found in two years using the yearly OLS models. Also, the relationship between institutional size and retention rates becomes negative, meaning that increases in institutional enrollment decrease institutional retention rates. This result is much more consistent with the findings of previous research than the findings of the yearly OLS models. The amount of variance explained in the yearly OLS models and the fixed effects models was also significantly different. The R-squared of the fixed effects

model was .92, which was around .20 higher than the R-squared of the yearly OLS models. This indicated that the fixed effects model was able to account for institutional differences that affect the relationship between racial diversity and institutional freshmen retention rates which are not fully explained by the measured predictors used in the yearly OLS models[20]. The intraclass correlation coefficient (rho) also provides evidence of the importance of including institutional fixed effects. The rho coefficient of .91 implies that 91% of the variance in freshmen retention rates can be accounted for using institutional fixed effects.

In examining the independent variable of interest, it was found that structural racial diversity has a positive, statistically significant association with institutional freshmen retention rates, $\beta = .19$, $p = .03$. This coefficient indicates that, controlling for other factors, as institutions of higher education became more racially diverse within their undergraduate student body, institutional retention rates increased by .19 points. The direction of this finding was different than the hypothesized direction of the relationship between diversity and institutional retention rates.

Though statistically significant, the effect size of structural racial diversity was small. The Cohen's f^2 effect size measure for structural diversity was .0211. This effect size would be considered small using the metric established by Cohen (1988) for determining the magnitude of an effect size[21].

[20] In order to test the differences in the R-squared of the fixed effect and non-fixed effect models, a test statistic was calculated using the method suggested by Allison (2005). The Chow test statistic (11.43) and associated p-value (.000) indicated that the R-squares were significantly different.

[21] According to Cohen (1998), f^2 effect sizes of .02, .15, and .35 are considered small, medium, and large, respectively.

Regression Models with Interaction Effects

In order to obtain a more nuanced understanding of the relationship found in Table 4.8, several interactions were included in the fixed effects models to determine if the relationship between diversity and retention is conditional on institutional characteristics**.** The results of these interactions designed to address research question 2 are presented in Tables 4.9 through 4.14. Table 4.9 displays coefficients of the fixed effects regression model which interacted structural racial diversity and institutional type in order to determine whether the influence of structural racial diversity was different at each type of institution studied. The result of the Wald test for significance of separate slopes indicates that the relationship between structural racial diversity and institutional freshmen retention rates is not significantly different for Research universities, Master's colleges, and Baccalaureate colleges, $F(2, 1214) = 1.43$, $p = .23$. In other words, the positive association between structural racial diversity and freshmen retention does not appear to be conditional on Carnegie Classification.

Table 4.10 displays the results of the fixed effects equation which included an interaction for structural racial diversity and commuter status. Again, the Wald test revealed no difference between primarily commuter, primarily non-commuter, and highly non-commuter institutions, $F(2, 1214) = .33$, $p = .72$. This indicates that percentage of students living on campus does not **moderate** the relationship between structural racial diversity and institutional retention rates. This same non-significant relationship can be seen in Table 4.11 in looking at the interaction between structural racial diversity and selectivity.

Table 4.9: Fixed Effects Model with Interaction by Carnegie Type

	B	Robust Standard Error
Structural Racial Diversity	0.38**	(0.13)
Structural Diversity X Master's	-0.16	(0.15)
Structural Diversity X Baccalaureate College	-0.30	(0.18)
Institutional Cost (Logged)	-0.18	(0.77)
Institution Size (Logged)	-2.87*	(1.33)
Institutional Expenditures on Academic Support Services (Logged)	0.030	(0.32)
Institutional Expenditures on Student Support Services (Logged)	0.52	(0.54)
Percent of Student Body Receiving Federal Pell Grant Aid	-1.00	(0.71)
Percent Minority of Freshmen Class	-0.12***	(0.03)
Percent Male of Freshmen Class	-0.16***	(0.02)
Year 2005	-0.15	(0.16)
Year 2006	-0.57**	(0.21)
Year 2007	-0.44	(0.27)
Year 2008	-0.30	(0.35)
Constant	95.3***	(16.24)
N	6064	
Groups	1215	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Research Universities
Dependent Variable: Overall Institution Freshmen Retention Rates

Table 4.10: Fixed Effects Model with Interaction by Commuter Status

	β	Robust Standard Error
Structural Racial Diversity	0.29	(0.15)
Structural Diversity X Prim Non-Com	-0.093	(0.18)
Structural Diversity X Highly Non-Com	-0.14	(0.18)
Institutional Cost (Logged)	-0.24	(0.77)
Institution Size (Logged)	-2.91*	(1.33)
Institutional Expenditures on Academic Support Services (Logged)	0.052	(0.32)
Institutional Expenditures on Student Support Services (Logged)	0.51	(0.53)
Percent of Student Body Receiving Federal Pell Grant Aid	-0.98	(0.70)
Percent Minority of Freshmen Class	-0.12***	(0.03)
Percent Male of Freshmen Class	-0.16***	(0.02)
Year 2005	-0.14	(0.16)
Year 2006	-0.56**	(0.21)
Year 2007	-0.42	(0.27)
Year 2008	-0.27	(0.34)
Constant	96.7***	(16.22)
N	6064	
Groups	1215	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Primarily Commuter
Dependent Variable: Overall Institution Freshmen Retention Rates

Slopes for less competitive, competitive, very competitive, highly competitive, and most competitive institutions were not significantly different than the slope for non-competitive institutions, $F (5, 1214) = .78$, $p = .57$. Institutional control, as noted in Table 4.12, was also found to be a non-significant moderator of the relationship between student body racial diversity and institutional retention rates. The freshmen retention rates of public and private institutions were found to be similarly influenced by structural racial diversity, $F (1, 1214) = .40$, $p = .52$. Table 4.13 shows that the interaction between structural racial diversity and institutional size is also statistically insignificant ($\beta = .11$, $p = .108$).

Table 4.11: Fixed Effects Model with Interactions by Institutional Selectivity

	β	Robust Standard Error
Structural Racial Diversity	0.30	(0.34)
Structural Diversity x Less Comp	-0.30	(0.38)
Structural Diversity x Comp	-0.094	(0.36)
Structural Diversity x Very Comp	0.10	(0.38)
Structural Diversity x High Comp	0.034	(0.39)
Structural Diversity x Most Comp	-0.072	(0.36)
Institutional Cost (Logged)	-0.15	(0.78)
Institution Size (Logged)	-2.91*	(1.34)
Institutional Expenditures on Academic Support Services (Logged)	0.089	(0.32)
Institutional Expenditures on Student Support Services (Logged)	0.51	(0.53)
Percent of Student Body Receiving Federal Pell Grant Aid	-1.00	(0.70)
Percent Minority of Freshmen Class	-0.12***	(0.03)
Percent Male of Freshmen Class	-0.16***	(0.02)
Year 2005	-0.16	(0.16)
Year 2006	-0.59**	(0.21)
Year 2007	-0.46	(0.27)
Year 2008	-0.33	(0.35)
Constant	94.5***	(16.17)
N	6064	
Groups	1215	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non-Selective
Dependent Variable: Overall Institution Freshmen Retention Rates

Table 4.12: Fixed Effects Model with Interaction by Institutional Control

	β	Robust Standard Error
Structural Racial Diversity	0.26*	(0.13)
Structural Diversity x Private	-0.094	(0.15)
Institutional Cost (Logged)	-0.23	(0.77)
Institution Size (Logged)	-2.83*	(1.35)
Institutional Expenditures on Academic Support Services (Logged)	0.055	(0.32)
Institutional Expenditures on Student Support Services (Logged)	0.53	(0.54)
Percent of Student Body Receiving Federal Pell Grant Aid	-0.98	(0.70)
Percent Minority of Freshmen Class	-0.11***	(0.03)
Percent Male of Freshmen Class	-0.16***	(0.02)
Year 2005	-0.15	(0.16)
Year 2006	-0.58**	(0.21)
Year 2007	-0.44	(0.27)
Year 2008	-0.30	(0.35)
Constant	95.1***	(16.46)
N	6064	
Groups	1215	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Public
Dependent Variable: Overall Institution Freshmen Retention Rates

Table 4.13: Fixed Effects Model with Interaction by Institutional Size

	B	Robust Standard Error
Structural Racial Diversity	-0.68	(0.57)
Structural Diversity x Log Size	0.11	(0.07)
Institutional Cost (Logged)	-0.25	(0.77)
Institution Size (Logged)	-10.7*	(4.80)
Institutional Expenditures on Academic Support Services (Logged)	0.036	(0.32)
Institutional Expenditures on Student Support Services (Logged)	0.54	(0.54)
Percent of Student Body Receiving Federal Pell Grant Aid	-1.02	(0.70)
Percent Minority of Freshmen Class	-0.11***	(0.03)
Percent Male of Freshmen Class	-0.16***	(0.02)
Year 2005	-0.15	(0.16)
Year 2006	-0.59**	(0.21)
Year 2007	-0.46	(0.27)
Year 2008	-0.33	(0.35)
Constant	155.8***	(40.14)
N	6064	
Groups	1215	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Freshmen Retention Rates

Research question 3 of this study asked whether the influence of structural racial diversity was different at Minority serving institutions (MSIs) and predominately non-Minority serving institutions. This question is addressed in Tables 4.14 and 4.15. In Table 4.14, it can be seen that the interaction between structural racial diversity and MSI status was not statistically significant, $F(1, 1214) = .01$, $p = .91$. The interaction between structural racial diversity and HBCU status, as seen in Table 4.15, was also not statistically significant, $F(1, 1214) = .47$, $p = .49$. These findings suggest that the relationship between racial diversity and freshmen retention rates is similar at Minority serving institutions and non-Minority serving institutions. These results, however, could be driven by the lack of MSIs in the analytic group used for this study. Among the 1215 institutions used in this section of the study, only 123 were MSIs and of those only 69 were HBCUs. This unequal distribution could be driving the aforementioned interaction effect.

Review of Chapter and Data Analysis

Chapter IV presented findings addressing the first three research questions in this study, which sought to examine how undergraduate racial diversity was correlated with freshmen retention rates. The chapter began with a summary of the data cleaning methods used to obtain the analytic group for this study. Summary statistics for the 1215 institutions studied were then presented followed by a detailing of the results of the regression analyses run to address the aforementioned research questions.

Table 4.14: Fixed Effects Model with Interaction by MSI

	β	Robust Standard Error
Structural Racial Diversity	0.20*	(0.10)
Structural Diversity x MSI	-0.039	(0.34)
Institutional Cost (Logged)	-0.21	(0.78)
Institution Size (Logged)	-2.88*	(1.32)
Institutional Expenditures on Academic Support Services (Logged)	0.061	(0.32)
Institutional Expenditures on Student Support Services (Logged)	0.52	(0.53)
Percent of Student Body Receiving Federal Pell Grant Aid	-1.00	(0.70)
Percent Minority of Freshmen Class	-0.12***	(0.03)
Percent Male of Freshmen Class	-0.16***	(0.02)
Year 2005	-0.15	(0.16)
Year 2006	-0.57**	(0.22)
Year 2007	-0.44	(0.28)
Year 2008	-0.29	(0.35)
Constant	96.2***	(16.28)
N	6064	
Groups	1215	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non-MSI
Dependent Variable: Overall Institution Freshmen Retention Rates

Table 4.15: Fixed Effects Model with Interaction by HBCU

	β	Robust Standard Error
Structural Racial Diversity	0.17	(0.09)
Structural Diversity x HBCU	0.39	(0.57)
Institutional Cost (Logged)	-0.26	(0.78)
Institution Size (Logged)	-2.76*	(1.30)
Institutional Expenditures on Academic Support Services (Logged)	0.059	(0.32)
Institutional Expenditures on Student Support Services (Logged)	0.55	(0.53)
Percent of Student Body Receiving Federal Pell Grant Aid	-0.98	(0.70)
Percent Minority of Freshmen Class	-0.11***	(0.03)
Percent Male of Freshmen Class	-0.16***	(0.02)
Year 2005	-0.14	(0.16)
Year 2006	-0.57**	(0.21)
Year 2007	-0.43	(0.27)
Year 2008	-0.28	(0.35)
Constant	95.7***	(16.20)
N	6064	
Groups	1215	
R-sq	0.92	
Wald chi-square test	F-Stat .47	p-value .49

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non-HBCU
Dependent Variable: Overall Institution Freshmen Retention Rates

The results of these regression analyses offer interesting and important insights into the relationship between racial diversity and institutional freshmen retention rates. In comparing the results of yearly OLS models to estimations using year and institutional fixed effects, it was evident that the fixed effects model was able to account for institutional differences that affect the relationship between racial diversity and institutional freshmen retention rates which could not be controlled for in the yearly OLS models with the data that are currently available. Therefore, the fixed effect model was determined to be the most robust statistical model for examining how structural diversity is associated with freshmen retention rates. In relation to research question 1, the results of the fixed effects estimations indicated that structural racial diversity had a positive, statistically significant correlation with retention rates. As institutions became more diverse in their undergraduate student body, their freshmen retention rates also increased slightly, controlling for other factors. The overall effect size of this relationship was small, however. This positive relationship between diversity and freshmen retention rates was different than the hypothesized relationship between these two variables.

In further examining the relationship between student body racial diversity and freshmen retention rates, it was found that this positive relationship was fairly consistent across various institutional characteristics. Interactions between structural racial diversity and institutional type, residentiality, selectivity, control, MSI status, and HBCU status were all found not to be statistically significant. This suggest that the relationship between diversity and freshmen retention is not conditional on institutional characteristics, meaning that all institutions appear to have benefited from increases in racial diversity as it relates to freshmen retention rates. Put differently the positive

influence of racial structural diversity on first year retention is invariant across various institutional characteristics.

In sum, the results presented in Chapter IV suggest that student body racial diversity has a small positive association with college and university freshmen retention rates. Chapter V presents findings exploring the relationship between racial diversity and institutional six-year graduation rates.

CHAPTER V

DATA ANALYSIS AND RESULTS

STUDENT BODY RACIAL DIVERSITY AND SIX-YEAR GRADUATION RATES

This chapter describes the results of the data analyses used to address research questions four through seven of this study. These questions were:

4. Controlling for other factors, what is the relationship between structural diversity and an institution's six-year graduation rate?
5. Controlling for other factors, is the relationship between structural diversity and institutional six-year graduation rates conditional on institutional type or institutional enrollment size?
6. Controlling for other factors, is the relationship between structural diversity and institutional six-year graduation rates different for Predominantly White Institutions and for Minority-Serving Institutions?
7. Controlling for other factors, what is the relationship between structural diversity and an institution's six-year graduation rate for different racial groups?

Each of these questions addressed the association between student body racial diversity and six-year graduation rates. As with Chapter IV, this chapter is divided into three sections. In section one, a description of the data cleaning techniques used to correct or remove inaccurate/incomplete data is presented. Section two presents descriptive statistics of the variables used for analysis. Finally, the chapter ends with a detailing of

the results of regression analyses conducted to quantify the association between student body racial diversity and institutional freshmen retention rates.

Data Cleaning

As done in Chapter IV, data analysis for this section of the study began with a review of the 1,112 colleges and universities which served as the original analytic group for research questions pertaining to the influence of diversity on institutional graduation rates. Upon reviewing data from these institutions, it was noticed that significant inaccuracies and missing data existed. Because these incomplete and inaccurate data could lead to biased multivariate analyses, additional data cleaning was performed to ensure that the most valid data possible was used for regression analyses.

This data cleaning process began by dropping institutions with incomplete six-year graduation rate data. Any institution which did not report their graduation rate to IPEDS in 5 or more of the 12 years between 1997 and 2008 was dropped in order to ensure the creation of a strongly balanced dataset for estimations using institutional fixed effects. Institutions with incomplete student body racial diversity data were also dropped using the same criteria used for dropping institutions without graduation rate data (if more than four years of data were missing, the school was dropped)[22].

Because analyses of the relationship between racial diversity and race-specific graduation rates were also conducted in this portion of the study, the above data cleaning techniques were also used to clean institutional race-specific graduation rate data. For example, any institution which did not report their African American graduation rate in 5

[22] A review of the missing data suggested that the non-reporting of graduation rates and student body racial diversity appeared to be completely random and exogenous to the models used in this study.

or more of the 12 years used for this study was dropped from regression analyses which used African American graduation rates as the dependent variable. This was done for all race-specific graduation rate data collected[23].

Preliminary analysis of race-specific graduation rate and enrollment data also revealed that many institutions enrolled very small numbers of students from certain racial groups in their freshmen class. These very small race-specific enrollment figures could lead to dramatic shifts in an institution's race-specific graduation rate based on the decision of 1 or 2 students. Therefore, it was decided to drop institutions which averaged less than ten students of a particular race when that race's graduation rate data were used in a model. For example, when examining the relationship between structural racial diversity and institutional Hispanic graduation rates, institutions with an average Hispanic freshmen enrollment of less than 10 between 1991 and 2002 were dropped from analysis.

The second step in the data cleaning process was to account for missing and clearly inaccurate control variables. A variety of methods were used to correct these errors. In situations where institutional data were missing or incorrect for only one or two years, missing year's data were imputed using existing institutional data. In situations where several years of data were missing or inaccurate, institutions' websites and other college guides were used to find correct information. Finally, in situations where neither of the above techniques produced accurate data, mean substitution was used. As with the data from Chapter IV, this method was only needed in the case of two variables (Institutional Expenditures on Student Support Services and Percentage of

[23] As noted in Chapter III, the race-specific graduation rates collected for this study were for African American, Asian, Hispanic, White, and all Minority (a composite of African American, Asian, and Hispanic) students.

Student Body Receiving Federal Pell Grant Aid) at less than 20 institutions. Given this very small percentage, it is not believed that using mean substitution significantly changed the outcomes of the regression analyses ran.

These techniques of imputation and mean replacement were only used for missing and inaccurate data on control variables. In situations where the six-year graduation rate (the dependent variable) or the student body racial diversity (the independent variable of interest) was missing or clearly inaccurate for a given year, the information was left as missing. Therefore, in both cross-sectional and panel regression analyses, these years where dropped from the analysis.

After using these data cleaning techniques, a final sample of 1109 institutions (Final Graduation Rate Group) were used for analyses of the influence of student body racial diversity on overall institution six-year graduation rates. For analyses examining the influence of student body racial diversity on Minority student graduation rates, the sample of 1049 colleges and universities were analyzed. When the graduation rates of White, African American, Hispanic, and Asian students were used as the dependent variables a total of 1068, 860, 618, and 556 institutions, respectively, were used. The varying sample sizes are due primarily to the dropping of institutions with extremely low freshmen enrollment of a particular race. For example, of the 1112 institutions originally part of this study's analytic group, 452 institutions were dropped due to the fact that their average freshmen enrollment of Hispanic students from 1991-2002 was less than ten students. While these drastic differences in sample sizes are not ideal, it is believed that they are necessary in order to obtain estimations that are unbiased by radical changes in institution graduation rates based on the enrollment decision of one or two students.

Descriptive Analyses

Summary statistics for each control variable used in this portion of the study are presented in Tables 5.1 and 5.2. Each column presents means and frequencies for the group of institutions used to analyze each race-specific graduation rate. In inspecting the institutional enrollment size data in Table 5.1, it is evident that the institutions dropped from analysis when examining the relationship between racial diversity and race-specific graduation rates were smaller institutions. The mean institutional size when examining total graduation rates was 4536. This mean jumped to over 6500 for schools used to examine institutional Hispanic and Asian graduation rates. This increase suggests that many smaller institutions were eliminated from the analyses when examining institutional race-specific graduation rates.

Many of the other control variables summarized in Table 5.1 remained relatively similar across the various estimations. The sample of institutions used for each estimation had similar levels of institutional expenditures, costs, enrollment of Pell grant students, and percentage of male students. Surprisingly, the percentage of Minority students in the freshmen class also did not change drastically over the different samples. This is likely a function of institutional size. Though the schools used in models that focus on race-specific graduation rates have higher numbers of Minority students in their freshmen classes, they also have overall larger freshmen classes meaning that the percentages of Minority students will remain relatively similar to the sample used to examine overall institutional graduation rates.

Table 5.1: Overall Means and Standard Deviations for Continuous Variables by Analysis Group

	All	Minority	White	African American	Hispanic	Asian
Institution Size	4536.7 (5169.4)	4731.5 (5247.5)	4622.9 (5240.9)	5339.8 (5564.6)	6632.3 (6026.1)	7161.3 (6125.5)
Institutional Expenditures on Academic Support Services	2188.8 (3087.3)	2230.3 (3158.9)	2216.9 (3137.9)	2333.8 (3363.2)	2695.6 (3562.1)	2950.5 (4099.4)
Institutional Expenditures on Student Support Services	2200.8 (1580.2)	2198.2 (1600.0)	2220.9 (1599.6)	2160.1 (1632.1)	2188.1 (1813.7)	2229.8 (1857.7)
Institutional Cost	14767.6 (8706.1)	14793.8 (8809.9)	14974.7 (8763.4)	14342.1 (8927.8)	14683.8 (9714.1)	15170.2 (10093.2)
Percent of Student Body Receiving Federal Pell Grant Aid	29.23 (14.46)	29.08 (14.72)	27.80 (12.30)	29.53 (15.48)	26.43 (12.90)	24.27 (11.15)
Percent Male of Incoming Class	43.85 (20.76)	43.74 (12.86)	43.73 (13.07)	44.09 (12.49)	44.69 (11.45)	45.01 (11.53)
Percent Minority of Freshmen class	21.00 (23.72)	22.14 (24.06)	18.01 (18.70)	25.20 (25.18)	23.00 (19.13)	21.84 (17.72)
N	13308	12588	12816	10320	7416	6672
Total Institutions	1109	1049	1068	860	618	556

Table 5.2: Frequencies for Categorical Variables by Analysis Group

	All	Minority	White	African American	Hispanic	Asian
Institutional Control	Public: 459 Private: 650	Public: 443 Private: 606	Public: 442 Private: 626	Public: 402 Private: 458	Public: 326 Private: 292	Public: 305 Private: 251
Institution Location	City: 533 Suburb: 272 Town: 243 Rural: 61	City: 518 Suburb: 263 Town: 221 Rural: 47	City: 510 Suburb: 261 Town: 238 Rural: 59	City: 441 Suburb: 216 Town: 166 Rural: 37	City: 359 Suburb: 150 Town: 96 Rural: 13	City: 328 Suburb: 140 Town: 80 Rural: 8
Institution Type	Research: 241 Master's: 487 Bac.: 381	Research: 240 Master's: 465 Bac.: 344	Research: 236 Master's: 473 Bac.: 359	Research: 231 Master's: 389 Bac.: 240	Research: 225 Master's: 284 Bac.: 109	Research: 227 Master's: 223 Bac.: 106
Institutional Selectivity	N Comp: 69 L Comp: 202 Comp: 488 V Comp: 234 H Comp: 65 M Comp: 51	N Comp: 60 L Comp: 186 Comp: 459 V Comp: 229 H Comp: 64 M Comp: 51	N Comp: 62 L Comp: 188 Comp: 468 V Comp: 234 H Comp: 65 M Comp: 51	N Comp: 48 L Comp: 160 Comp: 373 V Comp: 175 H Comp: 56 M Comp: 48	N Comp: 31 L Comp: 93 Comp: 246 V Comp: 145 H Comp: 56 M Comp: 47	N Comp: 17 L Comp: 65 Comp: 210 V Comp: 152 H Comp: 62 M Comp: 50
Commuter School	P Com: 254 P N-Com: 378 H N-Com: 477	P Com: 246 P N-Com: 356 H N-Com: 447	P Com: 247 P N-Com: 366 H N-Com: 455	P Com: 226 P N-Com: 309 H N-Com: 325	P Com: 194 P N-Com: 212 H N-Com: 212	P Com: 172 P N-Com: 177 H N-Com: 207

Table 5.2 presents frequencies for the structural, non-changing control variables used in this study. In comparing the samples, it appears as though the institutions used to estimate institutional total graduation rates, overall Minority graduation rates, White graduation rates, and African American graduation rates had similar proportions with regard to institutional control, location, type, selectivity, and commuter status. The distribution of institutions for the analyses of Hispanic and Asian graduation rates with regard to these variables appears to be significantly different than the other groups.

Table 5.2 also presents interesting information on Minority enrollment at America's most selective colleges and universities. Very few highly competitive or most competitive institutions were dropped due to the lack of enrollment of Minority students in their freshmen classes. This is indicative of the fact that many of the most prestigious institutions of higher education in the United States are actively seeking to enroll Minority students.

Summary statistics by year for the dependent variables (institutional graduation rates) and the independent variable of interest (structural racial diversity) are presented in Tables 5.3 and 5.4. As expected, Table 5.3 shows that overall institutions have their highest graduation rates among White (55.58%) and Asian (57.50%) students with African American (42.80%) students having the lowest overall graduation rates. In inspecting the changes in graduation rates over the 12 cohorts studied, there appeared to be a universal increase in graduation rates. Overall graduation rates and race-specific graduation rates have each increased between 1997 and 2008.

Table 5.3: Means & Stand. Deviations of Institutional Graduation Rates by Year

	All	Minority	White	African American	Hispanic	Asian
1997	51.05 (18.18)	43.13 (20.58)	52.97 (18.35)	39.31 (21.08)	46.05 (22.57)	54.64 (22.73)
1998	50.85 (18.24)	42.36 (20.70)	52.82 (18.54)	39.25 (20.87)	45.25 (22.79)	54.59 (22.02)
1999	51.08 (17.93)	42.78 (20.65)	53.21 (18.11)	39.31 (21.42)	45.24 (22.10)	53.89 (21.94)
2000	51.51 (17.91)	43.57 (20.34)	53.63 (18.18)	39.89 (21.21)	45.91 (21.53)	55.45 (21.82)
2001	52.83 (17.71)	45.42 (20.09)	54.91 (17.88)	41.85 (21.29)	47.40 (22.53)	55.80 (21.71)
2002	53.36 (17.63)	45.95 (20.51)	55.28 (17.90)	43.18 (21.23)	48.20 (21.38)	56.68 (21.44)
2003	54.09 (17.70)	46.66 (20.23)	56.22 (17.81)	43.73 (20.28)	49.26 (21.78)	57.70 (21.36)
2004	54.39 (17.48)	47.19 (19.67)	56.23 (17.58)	44.40 (20.66)	49.39 (20.99)	58.94 (20.71)
2005	55.02 (17.53)	47.96 (20.13)	57.04 (17.68)	44.59 (20.65)	50.40 (21.19)	59.50 (20.96)
2006	55.43 (17.57)	48.59 (20.26)	57.48 (17.43)	45.71 (20.85)	51.85 (21.85)	60.32 (21.13)
2007	55.60 (17.69)	48.95 (19.95)	57.98 (17.35)	45.63 (20.48)	51.93 (20.52)	60.65 (21.10)
2008	56.34 (17.97)	49.00 (20.54)	58.58 (18.03)	45.87 (21.35)	53.00 (20.94)	61.43 (21.21)
Total	53.52 (17.88)	46.03 (20.43)	55.58 (17.99)	42.80 (21.09)	48.71 (21.82)	57.50 (21.64)

Table 5.4: Means & Stand. Deviations of Instit. Structural Diversity Scores by Year

	All	Minority	White	African American	Hispanic	Asian
1997	65.85 (6.742)	66.18 (6.764)	66.12 (6.715)	67.01 (6.939)	68.72 (7.212)	68.68 (7.475)
1998	66.10 (6.884)	66.44 (6.903)	66.38 (6.853)	67.31 (7.075)	69.08 (7.334)	69.05 (7.611)
1999	66.29 (7.018)	66.65 (7.035)	66.58 (6.984)	67.56 (7.209)	69.36 (7.463)	69.34 (7.744)
2000	66.45 (7.115)	66.81 (7.130)	66.74 (7.077)	67.74 (7.306)	69.57 (7.556)	69.55 (7.837)
2001	66.58 (7.184)	66.95 (7.198)	66.87 (7.145)	67.91 (7.374)	69.72 (7.622)	69.70 (7.901)
2002	66.71 (7.230)	67.09 (7.241)	67.01 (7.190)	68.06 (7.412)	69.86 (7.656)	69.82 (7.932)
2003	66.84 (7.258)	67.22 (7.269)	67.14 (7.216)	68.20 (7.437)	69.97 (7.672)	69.91 (7.943)
2004	66.97 (7.291)	67.35 (7.303)	67.28 (7.246)	68.33 (7.466)	70.09 (7.690)	70.02 (7.958)
2005	67.12 (7.320)	67.50 (7.334)	67.43 (7.272)	68.47 (7.495)	70.23 (7.700)	70.13 (7.968)
2006	67.28 (7.351)	67.66 (7.363)	67.59 (7.299)	68.63 (7.521)	70.39 (7.707)	70.28 (7.975)
2007	67.47 (7.379)	67.85 (7.392)	67.79 (7.322)	68.80 (7.546)	70.59 (7.713)	70.46 (7.979)
2008	67.68 (7.408)	68.06 (7.420)	68.00 (7.343)	69.00 (7.575)	70.81 (7.720)	70.68 (7.977)
Total	66.78 (7.201)	67.15 (7.216)	67.08 (7.159)	68.09 (7.384)	69.87 (7.606)	69.80 (7.873)

Table 5.4 shows that student body racial diversity has also gradually increased from 1997 to 2008. Across the samples used, structural racial diversity has increased, with overall mean levels of structural racial diversity scores ranging from 66.78 to 69.87. In addition to the yearly increases in overall structural racial diversity, Table 5.4 also shows a gradual increase in the standard deviations associated with overall structural racial diversity scores. This indicates that while overall racial diversity has increased, there is also a wider gap among colleges and universities with regard to racial diversity. This could be a sign that at certain institutions racial diversity is increasing while at others racial diversity has remained stagnant or even decreased[24].

The final tables displaying descriptive statistics (Tables 5.5 and 5.6) statistically display the amount of change in the variables used for this study over the 12 cohorts in which data were collected. Table 5.5 displays the average yearly standard deviations from 1997-2008 of the variables used in this study. What stands out in the table are the rather large average standard deviations in relation to six-year graduation rates. For samples used to study total graduation rates and White graduation rates, the mean standard deviation was around 4.3% and 4.8%. For samples used to study Minority, African American, Hispanic, and Asian graduation rates, the mean standard deviations are around 9%. This is likely due to the lower Minority enrollments at institutions used to examine race-specific graduation rates. For example, several institutions in this dataset enrolled freshmen classes with 10-12 African American students.

[24] As noted in Chapter III, each structural racial diversity scores is the average diversity of an institution over the six-years in which a cohort of students could be enrolled in that institution. For example, an institution's 1997 structural racial diversity score is the mean institutional structural racial diversity from 1991-1997 (the six years in which the 1991 cohort could have been enrolled in school).

Table 5.5: Average Yearly Standard Deviation of Variable Change from 1997-2008 by Analysis Group

	All	Minority	White	Black	Hisp	Asian
Six-year Graduation Rate	4.337 (2.099)	8.393 (4.622)	4.874 (2.884)	9.839 (4.821)	9.708 (4.481)	9.799 (4.970)
Structural Racial Diversity	0.910 (0.702)	0.926 (0.711)	0.927 (0.707)	0.983 (0.729)	0.985 (0.714)	0.938 (0.673)
Institution Size	346.4 (479.9)	361.4 (489.0)	352.0 (486.3)	408.9 (524.1)	502.1 (578.8)	523.1 (598.7)
Institutional Expenditures on Academic Support Services	524.9 (1204.9)	534.1 (1236.4)	528.1 (1226.0)	549.5 (1301.3)	626.9 (1349.3)	710.4 (1657.6)
Institutional Expenditures on Student Support Services	535.2 (504.2)	536.1 (514.3)	538.9 (510.6)	520.3 (513.6)	524.4 (583.8)	531.8 (599.2)
Institutional Cost	2962.4 (1707.9)	2951.2 (1711.8)	3007.9 (1713.6)	2855.0 (1744.1)	2941.6 (1864.4)	3023.2 (1919.5)
Percent of Student Body Receiving Federal Pell Grant Aid	2.141 (1.715)	2.135 (1.735)	2.103 (1.693)	2.166 (1.790)	1.974 (1.647)	1.815 (1.510)
Percent Minority of Freshmen class	2.676 (2.087)	2.752 (2.118)	2.692 (2.101)	2.903 (2.183)	2.838 (2.107)	2.655 (1.996)
Percent Male of Incoming Class	3.783 (14.97)	3.224 (3.507)	3.356 (4.628)	3.085 (3.386)	2.699 (2.958)	2.526 (2.963)

Table 5.6: Average Difference in Lowest and Highest Value for Each Variable from 1997-2008 by Analysis Group

	All	Minority	White	Black	Hisp	Asian
Six-year Graduation Rate	13.94	27.47	16.01	32.46	31.91	32.29
	(6.880)	(15.68)	(10.23)	(16.99)	(15.31)	(17.03)
Structural Racial Diversity	2.725	2.774	2.782	2.946	2.993	2.859
	(2.011)	(2.037)	(2.022)	(2.090)	(2.074)	(1.974)
Institution Size	990.7	1033.3	1006.5	1168.2	1429.4	1489.7
	(1358.5)	(1384.0)	(1377.0)	(1483.4)	(1637.9)	(1694.6)
Institutional Expenditures on Academic Support Services	1539.2	1566.5	1549.3	1619.0	1846.9	2089.3
	(3394.2)	(3482.5)	(3453.7)	(3679.3)	(3799.9)	(4661.9)
Institutional Expenditures on Student Support Services	1585.9	1588.8	1598.1	1544.5	1562.5	1587.0
	(1439.9)	(1468.6)	(1457.6)	(1477.1)	(1678.1)	(1724.7)
Institutional Cost	8999.1	8974.7	9138.3	8671.1	8931.6	9195.8
	(5011.4)	(5038.5)	(5025.7)	(5116.8)	(5497.1)	(5678.8)
Percent of Student Body Receiving Federal Pell Grant Aid	6.247	6.218	6.142	6.303	5.770	5.310
	(4.843)	(4.897)	(4.789)	(5.058)	(4.708)	(4.370)
Percent Minority of Freshmen class	8.719	8.969	8.782	9.448	9.166	8.580
	(6.649)	(6.740)	(6.691)	(6.920)	(6.536)	(6.029)
Percent Male of Incoming Class	11.99	10.58	10.95	10.13	8.846	8.299
	(36.79)	(10.78)	(13.63)	(10.06)	(8.846)	(8.826)

This low number, as noted earlier, can cause significant fluctuations in African American graduation rates based on the enrollment decisions of a small number of students. While the methodology used in this study tried to reduce this as much as possible, the first row in Table 5.5 shows that there were still some large fluctuations in race-specific graduation rates. The remainder of this table shows that the other variables used in this study changed in a fashion similar to what could be expected from previous research.

Table 5.6 displays the average difference in the lowest and highest value for each variable used in this dataset. As with Table 5.5, the first row of Table 5.6 shows some large fluctuations in race-specific graduation rates. Changes in structural racial diversity and percent Minority of freshmen class show institutions are becoming more racially diverse, though this is happening at a fairly slow rate.

As noted in Chapter IV, these descriptive statistics suggested the importance of including institutional controls in order to obtain as non-biased an estimate possible of the relationship between student body racial diversity and institutional graduation rates. Also, given the slow rate of institutional change with regard to institutional student body racial diversity, the correlation between diversity and institutional graduation rates using the fixed effects estimators would likely be relatively small.

Regression Analyses

As done in Chapter IV, the regression analyses conducted to estimate the influence of student body racial diversity on institutional six-year graduation rates began with the establishment of a level of statistical significance[25] and an examination of the

[25] The conventional .05 significance level was selected to identify significant relationships while relationships at the .01 and .001 levels were also separately identified.

distribution of the variables used in this study. Given that some were not normally distributed, log transformations of 4 variables (Institutional Cost, Institutional Size, Institutional Expenditures on Academic Support Services, Institutional Expenditures on Student Support Services) were performed. As in Chapter IV, the log transformation of other control variables was not performed due to the fact that they were normally distributed.

After observing the differences in estimations using the yearly OLS models and the fixed effects models in Chapter IV, the first regression analyses conducted for this section of the study were run as a yearly OLS model to determine if the fixed effects model provides the most robust estimates of the relationship between diversity and institutional graduation rates. This was done using total institutional graduation rate as the dependent variable Tables 5.7 and 5.8 display the results. In the yearly OLS model, the 13 independent variables are able to explain around 75% of the variance in graduation rates for each of the 12 years studied. With regard to the independent variable of interest, in all years except for one, structural racial diversity was found to have a statistically significant negative correlation with institutional graduation rates. These models suggest that institutions with higher levels of racial diversity had lower graduation rates, ceteris paribus.

The fixed effects model estimated to address research question 1(Table 5.8), however, suggest that there is no relationship between racial diversity and institutional graduation rates ($\beta = -.056$, $p = .475$). Given that the fixed effects model was able to explain 95% of the variance in institutional gradation and the high rho coefficient (.92) of the fixed effect model, it was determined that the fixed effects model was able to account

for institutional differences that affect the relationship between racial diversity and institutional graduation rates which are not fully explained by the predictors used in the yearly OLS models[26].

Given the robustness of the fixed effects model in comparison to the yearly OLS models, the remainder of the analyses were run using fixed effects models. Separate models and model variations were run to examine the relationship between racial diversity and institutional overall graduation rates and institutional race-specific graduation rates.

[26] As in Chapter IV, the Chow test was run to test the significance of the R-squared difference between the fixed effect and non-fixed effect models. It was again found that the R-squared differences are significantly different.

Table 5.7: OLS Regressions per Year

	1997	1998	1999	2000	2001	2002
Structural Racial Diversity	-0.31***	-0.20***	-0.25***	-0.22***	-0.22***	-0.21***
	(0.06)	(0.06)	(0.06)	(0.05)	(0.06)	(0.05)
Institutional Cost (Logged)	8.45***	6.95***	7.66***	6.45***	7.53***	8.00***
	(1.04)	(1.01)	(0.99)	(1.08)	(1.08)	(1.05)
Institution Size (Logged)	5.53***	5.52***	5.02***	4.96***	5.22***	5.80***
	(0.62)	(0.64)	(0.63)	(0.62)	(0.59)	(0.58)
Inst. Expend. on Academic	2.81***	2.76***	2.68***	2.79***	2.09**	2.23***
Support Services (Logged)	(0.73)	(0.73)	(0.74)	(0.73)	(0.68)	(0.62)
Inst. Expend on Student	0.85	1.25	0.98	1.47	1.60*	1.55*
Support Services (Logged)	(0.94)	(0.91)	(0.86)	(0.83)	(0.79)	(0.78)
Pct. of Student Body Receiving	-7.48***	-8.49***	-7.62***	-8.33***	-8.07***	-7.55***
Federal Pell Grant Aid	(0.95)	(0.99)	(0.92)	(1.01)	(0.95)	(0.91)
Pct. Minority of Freshmen class	-0.02	-0.04*	-0.03	-0.05**	-0.03	-0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Percent Male of	-0.14***	-0.15***	-0.13***	-0.14***	-0.13***	-0.13***
Incoming Class	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Control_Private	3.33*	3.42*	3.39*	3.65**	2.79*	2.28
	(1.39)	(1.34)	(1.35)	(1.32)	(1.41)	(1.32)
Location-Suburb	-0.60	-0.00	-0.27	-0.42	-0.43	-0.64
	(0.77)	(0.75)	(0.73)	(0.69)	(0.70)	(0.67)
Location-Town	1.66*	2.00*	1.80*	1.14	1.78*	0.97
	(0.80)	(0.80)	(0.81)	(0.82)	(0.77)	(0.73)
Location-Rural	0.95	0.52	0.72	1.57	0.80	1.76
	(1.44)	(1.27)	(1.24)	(1.20)	(1.22)	(1.34)
Type-Master's	0.49	0.65	-0.09	-0.36	-0.54	-0.13
	(0.99)	(1.00)	(0.99)	(0.98)	(0.94)	(0.89)
Type-Bac	2.36	2.13	1.08	0.88	1.64	1.94
	(1.21)	(1.26)	(1.22)	(1.26)	(1.17)	(1.10)
Prim Non-Com	6.58***	6.72***	5.78***	6.28***	6.20***	6.04***
	(0.95)	(0.97)	(0.93)	(0.93)	(0.90)	(0.87)
Highly Non-Com	9.76***	10.75***	8.93***	9.47***	9.04***	9.73***
	(1.30)	(1.33)	(1.23)	(1.24)	(1.20)	(1.13)
Select-Less Comp	0.75	2.21	0.74	1.43	0.85	0.04
	(1.61)	(1.50)	(1.63)	(1.44)	(1.46)	(1.34)
Select-Comp	3.15*	4.33**	3.77*	3.82**	2.96*	3.11*
	(1.52)	(1.45)	(1.57)	(1.39)	(1.40)	(1.28)
Select-Very Comp	8.60***	10.02***	9.40***	9.41***	8.77***	8.07***
	(1.66)	(1.61)	(1.72)	(1.61)	(1.51)	(1.41)
Select-Highly Comp	16.38***	16.69***	16.78***	15.14***	14.33***	14.11***
	(1.99)	(1.95)	(2.05)	(2.14)	(1.84)	(1.76)
Select-Most Comp	22.07***	23.00***	23.33***	22.67***	20.98***	20.13***
	(2.41)	(2.41)	(2.42)	(2.46)	(2.19)	(2.07)
Constant	-59.78***	-53.87***	-51.74***	-44.67***	-52.15***	-63.35***
	(12.54)	(12.39)	(12.06)	(12.02)	(11.99)	(11.54)
R-squared	0.758	0.757	0.754	0.761	0.764	0.763
N	1012	1034	1042	1034	1048	1105

Table 5.7, Continued

	2003	2004	2005	2006	2007	2008
Structural Racial Diversity	-0.25***	-0.24***	-0.15**	-0.14**	-0.11*	-0.09
	(0.06)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)
Institutional Cost (Logged)	8.58***	8.21***	7.84***	7.18***	8.38***	7.25***
	(1.20)	(1.20)	(1.24)	(1.22)	(1.28)	(1.35)
Institution Size (Logged)	5.57***	5.58***	5.32***	5.29***	5.32***	5.26***
	(0.59)	(0.58)	(0.57)	(0.55)	(0.55)	(0.58)
Inst. Expend. on Academic	2.24***	2.15***	2.02***	2.58***	2.05***	2.00***
Support Services (Logged)	(0.65)	(0.63)	(0.59)	(0.57)	(0.59)	(0.58)
Inst. Expend on Student Support	1.78*	1.49	1.21	0.83	0.93	0.79
Services (Logged)	(0.79)	(0.77)	(0.75)	(0.71)	(0.72)	(0.76)
Pct. of Student Body Receiving	-7.27***	-6.55***	-7.02***	-7.73***	-8.21***	-8.87***
Federal Pell Grant Aid	(1.01)	(0.96)	(0.95)	(0.94)	(0.97)	(1.00)
Pct. Minority of Freshmen class	-0.03	-0.04*	-0.06***	-0.06***	-0.06***	-0.07***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Percent Male of	-0.13***	-0.11***	-0.11***	-0.10***	-0.10***	-0.11***
Incoming Class	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)
Control_Private	1.37	1.73	0.91	1.66	-0.34	1.56
	(1.46)	(1.38)	(1.44)	(1.38)	(1.42)	(1.43)
Location-Suburb	-0.49	-0.31	-0.36	-0.19	-0.33	0.03
	(0.68)	(0.66)	(0.66)	(0.63)	(0.62)	(0.64)
Location-Town	0.87	0.81	0.61	1.46*	1.03	0.87
	(0.74)	(0.72)	(0.72)	(0.69)	(0.69)	(0.72)
Location-Rural	0.62	1.17	0.27	0.97	0.60	-0.77
	(1.18)	(1.06)	(1.04)	(1.19)	(1.12)	(1.10)
Type-Master's	0.10	0.45	0.55	0.75	0.79	0.36
	(0.95)	(0.88)	(0.88)	(0.89)	(0.87)	(0.91)
Type- Bac	1.91	1.75	1.81	1.97	2.52*	2.12
	(1.15)	(1.09)	(1.09)	(1.08)	(1.07)	(1.14)
Prim Non-Com	5.72***	5.67***	6.44***	6.07***	6.27***	6.58***
	(0.88)	(0.87)	(0.82)	(0.81)	(0.80)	(0.81)
Highly Non-Com	8.47***	8.22***	9.45***	9.27***	9.26***	9.71***
	(1.15)	(1.12)	(1.05)	(1.03)	(1.01)	(1.00)
Select-Less Comp	0.65	0.20	0.99	1.77	1.44	2.00
	(1.44)	(1.47)	(1.42)	(1.29)	(1.28)	(1.28)
Select-Comp	3.61**	2.99*	3.86**	4.54***	5.03***	4.75***
	(1.36)	(1.40)	(1.37)	(1.24)	(1.23)	(1.23)
Select-Very Comp	9.07***	9.45***	10.12***	11.20***	11.42***	11.13***
	(1.54)	(1.57)	(1.52)	(1.43)	(1.44)	(1.42)
Select-Highly Comp	15.77***	16.98***	17.21***	18.10***	18.07***	17.84***
	(1.90)	(1.89)	(1.83)	(1.79)	(1.80)	(1.81)
Select-Most Comp	21.46***	22.54***	23.01***	22.72***	22.69***	22.07***
	(2.23)	(2.24)	(2.14)	(2.17)	(2.14)	(2.20)
Constant	-67.11***	-64.71***	-60.87***	-56.77***	-65.77***	-52.09***
	(12.65)	(12.77)	(12.99)	(12.87)	(12.89)	(13.51)
R-squared	0.760	0.772	0.776	0.789	0.797	0.793
N	1107	1109	1107	1109	1103	1102

Notes: * p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses; Omitted Categories: Public, City, Research Universities, Primarily Commuter, & Non-Selective; Mean VIF across models ranged from 2.92 to 3.19; Dependent Variable: Overall Institution Six-Year Graduation Rates

Table 5.8: Fixed Effects Model

	β	Robust Standard Error
Structural Racial Diversity	-0.056	(0.08)
Institutional Cost (Logged)	2.40***	(0.62)
Institution Size (Logged)	2.84**	(0.97)
Institutional Expenditures on Academic Support Services (Logged)	0.0075	(0.40)
Institutional Expenditures on Student Support Services (Logged)	-0.45	(0.55)
Percent of Student Body Receiving Federal Pell Grant Aid	-5.20***	(0.73)
Percent Minority of Freshmen Class	-0.17***	(0.03)
Percent Male of Freshmen Class	-0.19***	(0.02)
Year 1998	-0.10	(0.16)
Year 1999	0.21	(0.19)
Year 2000	0.55*	(0.25)
Year 2001	1.77***	(0.29)
Year 2002	2.30***	(0.35)
Year 2003	2.92***	(0.39)
Year 2004	3.11***	(0.44)
Year 2005	3.61***	(0.48)
Year 2006	3.80***	(0.53)
Year 2007	3.86***	(0.58)
Year 2008	4.39***	(0.63)
Constant	42.1***	(11.72)
N	12912	
Groups	1109	
R-sq	0.95	
Rho	.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates

Racial Diversity & Institutional Overall Six-Year Graduation Rates

A closer look at Table 5.8 shows some expected and unexpected relationships between the control variables and institutional six-year graduation rates. As expected, percent of students receiving federal Pell grant aid, the percent Minority of the freshmen class, and percent male of incoming class each had a negative, statistically significant relationship with institutional graduation rates. A couple of unexpected findings were related to cost and size. For each of these variables, an approximately 2.5% increase was found to be correlated with a one percent increase in an institution's graduation rate. The findings related to size are different than the relationship found between institutional enrollment and freshmen retention rates in Table 4.8. Given that cost is often a barrier for student college completion, it was surprising to see that, as institutions increased their tuition and fees, they appeared to experience increased graduation rates. This could be due to the fact that these increased costs are accompanied by increased student aid, which has been found to increase a student's likelihood of graduating (Dynarski, 2003).

Regression Models with Interaction Effects

As noted, the results of Table 5.8 suggest that student body racial diversity does not have a significant influence on institutional graduation rates. A more detailed analysis of this relationship, however, suggests that this relationship is more nuanced than Table 5.8 suggests. Tables 5.9 through 5.15 present the results of interactions between structural racial diversity and various institutional characteristics which were estimated as part of the fixed effects models to address research questions 5 and 6. Tables 5.9, 5.12, 5.14, and 5.15 show that the relationship between student body racial diversity and

institutional graduation rates is not conditional on Carnegie Classification type, institutional control, MSI status, or HBCU status[27].

Table 5.10 indicated that commuter status may have a significant influence on the relationship between student body racial diversity and graduation rates. The Wald test for significance of separate slopes indicates that this interaction is statistically significant, $F(2, 1108) = 3.60$, $p = .03$. The beta coefficients in this table suggest that the differences are among primarily commuter and highly non-commuter institutions. Among primarily commuter institutions, a one unit increase in an institution's diversity score was estimated to be associated with a .13 point increase on institutional graduation rates. Among highly non-commuter institutions, however, the association was -.25 points. These results indicate that structural racial diversity may have a more positive association with graduation rates at commuter schools as compared to non-commuter institutions.

The interaction between diversity and institutional selectivity (Table 5.11) was also found to be statistically significant, $F(5, 1108) = 2.62$, $p = .02$. These findings, however, appear to be rather inconsistent and could be an artifact of sampling. Both very competitive and highly competitive institutions appeared to be significantly different than most competitive institutions with the graduation rates of most competitive schools being negatively influenced by increased diversity and the graduation rates of very competitive and highly competitive schools being positively influenced by increased student body racial diversity. Given the similarity of these schools, especially highly competitive and most selective schools, with regards to the type of students enrolled, this result was somewhat unexpected.

[27] Tables in this chapter displaying the results of fixed effects models with interaction terms only display beta coefficients for the independent variables of interest. Beta coefficients for control variables throughout each model specification were very similar in size and direction to the findings in Table 5.8.

Table 5.9: Fixed Effects Model with Interaction by Carnegie Type

	β	Robust Standard Error
Structural Racial Diversity	0.074	(0.14)
Structural Diversity X Master's	-0.18	(0.15)
Structural Diversity X Baccalaureate College	-0.15	(0.17)
N	12912	
Groups	1109	
R-sq	0.95	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Research Universities; Dependent Variable: Overall Institution Six-Year Graduation Rates

Table 5.10: Fixed Effects Model with Interaction by Commuter Status

	β	Robust Standard Error
Structural Racial Diversity	-.25*	(0.10)
Structural Diversity X Prim Commuter	0.38*	(0.15)
Structural Diversity X Prim Non-Commuter	0.25	(0.14)
N	12912	
Groups	1109	
R-sq	0.95	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Highly Non-Commuter; Dependent Variable: Overall Institution Six-Year Graduation Rates

Table 5.11: Fixed Effects Model with Interactions by Institutional Selectivity

	β	Robust Standard Error
Structural Racial Diversity	-0.29*	(0.12)
Structural Diversity x Non Comp	0.23	(0.22)
Structural Diversity x Less Comp	0.22	(0.19)
Structural Diversity x Comp	0.13	(0.14)
Structural Diversity x Very Comp	0.52**	(0.20)
Structural Diversity x Highly Comp	0.68**	(0.24)
N	12912	
Groups	1109	
R-sq	0.95	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Most Competitive; Dependent Variable: Overall Institution Six-Year Graduation Rates

Table 5.12: Fixed Effects Model with Interactions by Institutional Control

	β	Robust Standard Error
Structural Racial Diversity	0.044	(0.11)
Structural Diversity x Private	-0.15	(0.12)
N	12912	
Groups	1109	
R-sq	0.95	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Public Institutions; Dependent Variable: Overall Institution Six-Year Graduation Rates

Table 5.13: Fixed Effects Model with Interactions by Institutional Size

	β	Robust Standard Error
Structural Racial Diversity	-1.27**	(0.46)
Institution Size (Logged)	-7.69	(3.95)
Structural Diversity x Log Size	0.16**	(0.06)
N	12912	
Groups	1109	
R-sq	0.95	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates

Table 5.14: Fixed Effects Model with Interactions by MSI

	β	Robust Standard Error
Structural Racial Diversity	-0.025	(0.09)
Structural Diversity x MSI	-0.22	(0.32)
N	12912	
Groups	1109	
R-sq	0.95	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non MSIs; Dependent Variable: Overall Institution Six-Year Graduation Rates

Table 5.15: Fixed Effects Model with Interactions by HBCU

	β	Robust Standard Error
Structural Racial Diversity	-0.019	(0.08)
Structural Diversity x HBCU	-0.57	(0.35)
N	12912	
Groups	1109	
R-sq	0.95	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non HBCUs; Dependent Variable: Overall Institution Six-Year Graduation Rates

Given the relatively small number of institutions in the highly competitive and most competitive categories, these results could be a result of the size of the analytic group.

Institutional size was also found to have a statistically significant interaction with structural racial diversity ($\beta = .16$, $p=.006$). Table 5.13 indicates that for every one unit increase in institutional log size, the slope of the relationship between diversity and graduation rates increases by .16 points. Further probing of this interaction suggested that at institutions with enrollment at the group mean for institutional enrollment, a one unit increase in structural diversity was related to a reduction in graduation rates by -0.04 points, controlling for other factors. For institutions with enrollment at one standard deviation below the mean, the association of diversity on institutional graduation rates falls to -.19 points. A one unit increase in structural diversity had a .11 point influence on graduation rates at institutions with enrollment at one standard deviation above the group mean of enrollment. In other words, the correlation between racial diversity and institutional graduation rates was more positive at larger institutions of higher education.

Racial Diversity & Race Specific Six-Year Graduation Rates

This study's final research question asked whether the relationship between structural racial diversity and an institution's six-year graduation rate differed by racial group. The results of these analyses are presented below.

Racial Diversity & Institutional Minority Student Six-Year Graduation Rates

While Table 5.8 showed institutional overall graduation rates to be unaffected by changes in student body racial diversity, Table 5.16 suggests that diversity is positively

related to institution Minority graduation rates (β = .34, p = .005). A one unit increase in structural diversity score was found to be correlated with a .34 point increase in Minority student graduation rates. The effect size of student body racial diversity, however, was small (f^2 = .015). In examining the control variables in Table 5.16, they appear to be very similar to the coefficients found in Table 5.8.

In exploring the interactions between diversity and institutional characteristics in relation to their influence on Minority graduation rates (Table 5.17-5.23), two were found to be statistically significant. As with Table 5.11, selectivity was found to be significantly related to Minority graduation rates with both very competitive and highly competitive institutions appearing to be significantly different than most competitive institutions. It was also found that increased levels of student body racial diversity had a significantly different influence on the Minority graduation rates of HBCUs and non-HBCUs (Table 5.23). Among non-HBCUs, diversity appeared to have a .42 point association with Minority graduation rates. At HBCUs, diversity was estimated to have a -.73 point association with Minority graduation rates. These findings suggest that at HBCUs, increased diversity (i.e., the enrollment of more non-African American students) may actually hurt Minority graduation rates.

Racial Diversity & Institutional White Student Six-Year Graduation Rates

The correlation between racial diversity and institutional White student graduation rates are presented in Table 5.24. Controlling for other factors, it appears as though structural racial diversity does not have a statistically significant influence on White student graduation rates (β = -.085, p=.298).

Tables 5.25 through 5.31 indicate that only one institutional characteristic appears to have a significant interactive effect on the relationship between student body racial diversity and White student graduation rates. Table 5.26 shows the interaction between diversity and commuter status to be statistically significant, F (2, 1067) = 5.63, p = .003.

Table 5.16: Fixed Effects Model

	B	Robust Standard Error
Structural Racial Diversity	0.34**	(0.12)
Institutional Cost (Logged)	2.53**	(0.81)
Institution Size (Logged)	3.18	(1.63)
Institutional Expenditures on Academic Support Services (Logged)	-0.42	(0.70)
Institutional Expenditures on Student Support Services (Logged)	-1.08	(0.92)
Percent of Student Body Receiving Federal Pell Grant Aid	-6.03***	(1.18)
Percent Minority of Freshmen Class	-0.25***	(0.04)
Percent Male of Freshmen Class	-0.27***	(0.03)
Year 1998	-0.69	(0.42)
Year 1999	-0.16	(0.44)
Year 2000	0.63	(0.49)
Year 2001	2.27***	(0.54)
Year 2002	2.86***	(0.64)
Year 2003	3.46***	(0.68)
Year 2004	3.85***	(0.73)
Year 2005	4.47***	(0.78)
Year 2006	4.87***	(0.87)
Year 2007	5.06***	(0.94)
Year 2008	4.78***	(1.02)
Constant	19.8	(19.93)
N	12224	
Groups	1049	
R-sq	0.82	
Rho	.77	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Minority Students

Table 5.17: Fixed Effects Model with Interactions by Carnegie Type

	B	Robust Standard Error
Structural Racial Diversity	0.28	(0.19)
Structural Diversity X Master's	0.15	(0.22)
Structural Diversity X Baccalaureate College	-0.020	(0.25)
N	12224	
Groups	1049	
R-sq	0.82	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Research Universities; Dependent Variable: Overall Institution Six-Year Graduation Rates of All Minority Students

Table 5.18: Fixed Effects Model with Interactions by Commuter Status

	B	Robust Standard Error
Structural Racial Diversity	0.29	(0.17)
Structural Diversity X Prim Commuter	0.025	(0.23)
Structural Diversity X Prim Non-Commuter	0.13	(0.24)
N	12224	
Groups	1049	
R-sq	0.82	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Highly Non-Commuter; Dependent Variable: Overall Institution Six-Year Graduation Rates of All Minority Students

Table 5.19: Fixed Effects Model with Interactions by Institutional Selectivity

	B	Robust Standard Error
Structural Racial Diversity	-0.21	(0.19)
Structural Diversity x Non Comp	-0.086	(0.36)
Structural Diversity x Less Comp	0.31	(0.30)
Structural Diversity x Comp	0.64**	(0.23)
Structural Diversity x Very Comp	0.83**	(0.30)
Structural Diversity x Highly Comp	1.36***	(0.32)
N	12224	
Groups	1049	
R-sq	0.82	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Most Selective; Dependent Variable: Overall Institution Six-Year Graduation Rates of All Minority Students

Table 5.20: Fixed Effects Model with Interaction by Institutional Control

	B	Robust Standard Error
Structural Racial Diversity	0.36*	(0.14)
Structural Diversity x Private	-0.030	(0.18)
N	12224	
Groups	1049	
R-sq	0.82	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Public Institutions; Dependent Variable: Overall Institution Six-Year Graduation Rates of All Minority Students

Table 5.21: Fixed Effects Model with Interaction by Institutional Size

	B	Robust Standard Error
Structural Racial Diversity	-0.39	(0.68)
Institution Size (Logged)	-3.11	(6.12)
Structural Diversity x Log Size	0.092	(0.08)
N	12224	
Groups	1049	
R-sq	0.82	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Minority Students

Table 5.22: Fixed Effects Model with Interaction by MSI

	B	Robust Standard Error
Structural Racial Diversity	-0.025	(0.09)
Structural Diversity x MSI	-0.22	(0.32)
N	12224	
Groups	1049	
R-sq	0.82	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non MSIs; Dependent Variable: Overall Institution Six-Year Graduation Rates of All Minority Students

Table 5.23: Fixed Effects Model with Interaction by HBCU

	B	Robust Standard Error
Structural Racial Diversity	0.42**	(0.13)
Structural Diversity x HBCU	-1.15*	(0.46)
N	12224	
Groups	1049	
R-sq	0.82	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non HBCUs; Dependent Variable: Overall Institution Six-Year Graduation Rates of All Minority Students

Table 5.24: Fixed Effects Model

	B	Robust Standard Error
Structural Racial Diversity	-0.085	(0.08)
Institutional Cost (Logged)	3.02***	(0.64)
Institution Size (Logged)	2.29*	(1.02)
Institutional Expenditures on Academic Support Services (Logged)	0.040	(0.41)
Institutional Expenditures on Student Support Services (Logged)	-0.093	(0.60)
Percent of Student Body Receiving Federal Pell Grant Aid	-4.63***	(0.79)
Percent Minority of Freshmen Class	-0.11**	(0.03)
Percent Male of Freshmen Class	-0.21***	(0.02)
Year 1998	-0.18	(0.21)
Year 1999	0.13	(0.24)
Year 2000	0.51	(0.30)
Year 2001	1.62***	(0.35)
Year 2002	1.91***	(0.42)
Year 2003	2.69***	(0.46)
Year 2004	2.50***	(0.49)
Year 2005	3.10***	(0.54)
Year 2006	3.29***	(0.59)
Year 2007	3.61***	(0.64)
Year 2008	3.90***	(0.71)
Constant	39.3**	(12.84)
N	12440	
Groups	1068	
R-sq	0.92	
Rho	.89	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates of All White Students

Table 5.25: Fixed Effects Model with Interactions by Carnegie Type

	B	Robust Standard Error
Structural Racial Diversity	-0.028	(0.12)
Structural Diversity X Master's	-0.052	(0.15)
Structural Diversity X Baccalaureate College	-0.11	(0.16)
N	12440	
Groups	1068	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Research Universities
Dependent Variable: Overall Institution Six-Year Graduation Rates of All White Students

Table 5.26: Fixed Effects Model with Interactions by Commuter Status

	B	Robust Standard Error
Structural Racial Diversity	-0.30**	(0.10)
Structural Diversity X Prim Commuter	0.48***	(0.14)
Structural Diversity X Prim Non-Commuter	0.24	(0.15)
N	12440	
Groups	1068	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Highly Non-Commuter
Dependent Variable: Overall Institution Six-Year Graduation Rates of All White Students

Table 5.27: Fixed Effects Model with Interactions by Institutional Selectivity

	B	Robust Standard Error
Structural Racial Diversity	-0.38**	(0.13)
Structural Diversity x Non Comp	0.34	(0.31)
Structural Diversity x Less Comp	0.33	(0.19)
Structural Diversity x Comp	0.24	(0.15)
Structural Diversity x Very Comp	0.41*	(0.18)
Structural Diversity x Highly Comp	0.60*	(0.24)
N	12440	
Groups	1068	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Most Selective
Dependent Variable: Overall Institution Six-Year Graduation Rates of All White Students

Table 5.28: Fixed Effects Model with Interaction by Institutional Control

	B	Robust Standard Error
Structural Racial Diversity	-0.086	(0.11)
Structural Diversity x Private	0.0016	(0.12)
N	12440	
Groups	1068	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Public Institutions
Dependent Variable: Overall Institution Six-Year Graduation Rates of All White Students

Table 5.29: Fixed Effects Model with Interaction by Institutional Size

	B	Robust Standard Error
Structural Racial Diversity	-0.41	(0.44)
Institution Size (Logged)	-0.54	(3.72)
Structural Diversity x Log Size	0.042	(0.05)
N	12440	
Groups	1068	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates of All White Students

Table 5.30: Fixed Effects Model with Interaction by MSI

	B	Robust Standard Error
Structural Racial Diversity	-0.073	(0.09)
Structural Diversity x MSI	-0.091	(0.35)
N	12440	
Groups	1068	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non MSIs
Dependent Variable: Overall Institution Six-Year Graduation Rates of All White Students

Table 5.31: Fixed Effects Model with Interaction by HBCU

	B	Robust Standard Error
Structural Racial Diversity	-0.056	(0.08)
Structural Diversity x HBCU	-0.55	(0.55)
N	12440	
Groups	1068	
R-sq	0.92	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non HBCUs
Dependent Variable: Overall Institution Six-Year Graduation Rates of All White Students

The influence of racial diversity on White student graduation rates was found to be more positive at primarily commuter institutions as compared to highly non-commuter institutions. In general, however, the non-significant relationship between student body racial diversity and White student graduation rates is fairly consistent across institutions.

Racial Diversity & Institutional African American Student Six-Year Graduation Rates

African American graduation rates appear to be positively correlated with structural racial diversity. Table 5.32 shows that a one unit increase in structural racial diversity scores increases institutional African American graduation rates by .37 points, ceteris paribus. Again, however, the effect size of this coefficient was small (f^2 = .032).

In exploring the interactive effects in Tables 5.32 through 5.39, only institutional size (Table 5.37) appears to be statistically significant. A one unit increase in the log size of an institution increases the slope of the influence of structural racial diversity on African American graduation rates by .28 points. As with other models where there was a significant interaction between size and diversity, further exploration of this model was done in order to determine how racial diversity influences African American graduation rates at the mean and one standard deviation above and below the mean of institutional enrollment.

Table 5.32: Fixed Effects Model

	β	Robust Standard Error
Structural Racial Diversity	0.37*	(0.16)
Institutional Cost (Logged)	0.46	(1.09)
Institution Size (Logged)	4.14*	(1.96)
Institutional Expenditures on Academic Support Services (Logged)	-1.48	(0.88)
Institutional Expenditures on Student Support Services (Logged)	-0.99	(1.26)
Percent of Student Body Receiving Federal Pell Grant Aid	-7.26***	(1.55)
Percent Minority of Freshmen Class	-0.28***	(0.05)
Percent Male of Freshmen Class	-0.25***	(0.04)
Year 1998	0.44	(0.53)
Year 1999	0.76	(0.59)
Year 2000	1.59**	(0.61)
Year 2001	3.40***	(0.68)
Year 2002	4.96***	(0.78)
Year 2003	5.53***	(0.80)
Year 2004	6.23***	(0.89)
Year 2005	6.39***	(0.95)
Year 2006	7.46***	(1.08)
Year 2007	7.36***	(1.17)
Year 2008	7.41***	(1.29)
Constant	35.6	(24.85)
N	10030	
Groups	860	
R-sq	0.78	
Rho	.75	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates of All African American Students

Table 5.33: Fixed Effects Model with Interactions by Carnegie Type

	β	Robust Standard Error
Structural Racial Diversity	0.63*	(0.26)
Structural Diversity X Master's	-0.21	(0.28)
Structural Diversity X Baccalaureate College	-0.61	(0.34)
N	10030	
Groups	860	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Research Universities
Dependent Variable: Overall Institution Six-Year Graduation Rates of All African American Students

Table 5.34: Fixed Effects Model with Interactions by Commuter Status

	β	Robust Standard Error
Structural Racial Diversity	0.39	(0.24)
Structural Diversity X Prim Commuter	0.044	(0.30)
Structural Diversity X Prim Non-Commuter	-0.10	(0.31)
N	10030	
Groups	860	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Highly Non-Commuter
Dependent Variable: Overall Institution Six-Year Graduation Rates of All African American Students

Table 5.35: Fixed Effects Model with Interactions by Institutional Selectivity

	β	Robust Standard Error
Structural Racial Diversity	0.078	(0.35)
Structural Diversity x Non Comp	0.072	(0.46)
Structural Diversity x Less Comp	-0.056	(0.44)
Structural Diversity x Comp	0.33	(0.38)
Structural Diversity x Very Comp	0.76	(0.45)
Structural Diversity x Highly Comp	0.83	(0.60)
N	10030	
Groups	860	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Most Selective
Dependent Variable: Overall Institution Six-Year Graduation Rates of All African American Students

Table 5.36: Fixed Effects Model with Interaction by Institutional Control

	β	Robust Standard Error
Structural Racial Diversity	0.44*	(0.18)
Structural Diversity x Private	-0.12	(0.23)
N	10030	
Groups	860	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Public Institutions
Dependent Variable: Overall Institution Six-Year Graduation Rates of All African American Students

Table 5.37: Fixed Effects Model with Interaction by Institutional Size

	β	Robust Standard Error
Structural Racial Diversity	-1.89*	(0.88)
Institution Size (Logged)	-15.5*	(7.75)
Structural Diversity x Log Size	0.28**	(0.11)
N	10030	
Groups	860	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates of All African American Students

Table 5.38: Fixed Effects Model with Interaction by MSI

	β	Robust Standard Error
Structural Racial Diversity	0.48*	(0.19)
Structural Diversity x MSI	-0.66	(0.34)
N	10030	
Groups	860	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non MSIs
Dependent Variable: Overall Institution Six-Year Graduation Rates of All African American Students

Table 5.39: Fixed Effects Model with Interaction by HBCU

	β	Robust Standard Error
Structural Racial Diversity	0.43*	(0.18)
Structural Diversity x HBCU	-0.84	(0.45)
N	10030	
Groups	860	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non HBCUs
Dependent Variable: Overall Institution Six-Year Graduation Rates of All African American Students

For institutions at the enrollment mean, a one unit increase in structural diversity was found to reduce African American graduation rates by .004 points. At one standard deviation below the mean, the slope of the relationship between diversity and African American graduation rates was estimated to be -.14. Institutions with enrollments one standard deviation above the mean were estimated to see student body racial diversity have a .13 point association with African American graduation rates. As before, these findings suggest structural racial diversity has a more positive association with African American graduation rates at larger institutions of higher education.

Though not statistically significant, the interaction between diversity and HBCU status with regard to African American graduation rates (Table 5.39) was marginally significant (β = -.84 p = .061). The interaction between diversity and MSI status (Table 5.38) was also very close to statistical significance (β = -.66 p = .053).

Racial Diversity & Institutional Hispanic Student Six-Year Graduation Rates

As can be seen in Tables 5.40-5.47, the association between student body racial diversity and institutional Hispanic student graduation rates was not statistically significant. Neither the main effects model (Table 5.40) nor any of the interaction models (Tables 5.41-5.47) found a statistically significant relationship between diversity and Hispanic graduation rates.

Table 5.40: Fixed Effects Model

	β	Robust Standard Error
Structural Racial Diversity	-0.29	(0.19)
Institutional Cost (Logged)	2.30*	(1.16)
Institution Size (Logged)	4.36	(2.51)
Institutional Expenditures on Academic Support Services (Logged)	-0.33	(0.82)
Institutional Expenditures on Student Support Services (Logged)	-0.41	(1.21)
Percent of Student Body Receiving Federal Pell Grant Aid	-2.89	(1.76)
Percent Minority of Freshmen Class	-0.20***	(0.05)
Percent Male of Freshmen Class	-0.16**	(0.06)
Year 1998	-0.50	(0.69)
Year 1999	-0.44	(0.67)
Year 2000	0.14	(0.73)
Year 2001	1.49	(0.85)
Year 2002	2.34*	(0.90)
Year 2003	3.32***	(0.96)
Year 2004	3.24**	(1.08)
Year 2005	4.02***	(1.09)
Year 2006	5.32***	(1.27)
Year 2007	5.26***	(1.34)
Year 2008	6.09***	(1.45)
Constant	34.5	(29.49)
N	7235	
Groups	618	
R-sq	0.80	
Rho	.76	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Hispanic Students

Table 5.41: Fixed Effects Model with Interactions by Carnegie Type

	β	Robust Standard Error
Structural Racial Diversity	-0.15	(0.24)
Structural Diversity X Master's	-0.14	(0.28)
Structural Diversity X Baccalaureate College	-0.43	(0.39)
N	7235	
Groups	618	
R-sq	0.80	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Research Universities
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Hispanic Students

Table 5.42: Fixed Effects Model with Interactions by Commuter Status

	β	Robust Standard Error
Structural Racial Diversity	-0.45	(0.26)
Structural Diversity X Prim Commuter	0.18	(0.30)
Structural Diversity X Prim Non-Commuter	0.30	(0.35)
N	7235	
Groups	618	
R-sq	0.80	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Highly Non-Commuter
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Hispanic Students

Table 5.43: Fixed Effects Model with Interactions by Institutional Selectivity

	β	Robust Standard Error
Structural Racial Diversity	-0.37	(0.35)
Structural Diversity x Non Comp	-0.04	(0.63)
Structural Diversity x Less Comp	0.24	(0.45)
Structural Diversity x Comp	-0.05	(0.39)
Structural Diversity x Very Comp	0.05	(0.50)
Structural Diversity x Highly Comp	0.68	(0.50)
N	7235	
Groups	618	
R-sq	0.80	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Most Selective
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Hispanic Students

Table 5.44: Fixed Effects Model with Interaction by Institutional Control

	β	Robust Standard Error
Structural Racial Diversity	-0.28	(0.27)
Structural Diversity x Private	-0.0097	(0.27)
N	7235	
Groups	618	
R-sq	0.80	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Public Institutions
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Hispanic Students

Table 5.45: Fixed Effects Model with Interaction by Institutional Size

	β	Robust Standard Error
Structural Racial Diversity	-0.98	(0.94)
Institution Size (Logged)	-1.84	(8.77)
Structural Diversity x Log Size	0.085	(0.11)
N	7235	
Groups	618	
R-sq	0.80	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Hispanic Students

Table 5.46: Fixed Effects Model with Interaction by MSI

	β	Robust Standard Error
Structural Racial Diversity	-0.28	(0.20)
Structural Diversity x MSI	-0.028	(0.48)
N	7235	
Groups	618	
R-sq	0.80	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non MSIs
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Hispanic Students

Table 5.47: Fixed Effects Model with Interactions by HBCU

	β	Robust Standard Error
Structural Racial Diversity	-0.26	(0.19)
Structural Diversity x HBCU	-1.79	(1.72)
N	7235	
Groups	618	
R-sq	0.80	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non HBCUs
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Hispanic Students

Table 5.48: Fixed Effects Model

	β	Robust Standard Error
Structural Racial Diversity	0.41*	(0.20)
Institutional Cost (Logged)	1.56	(1.12)
Institution Size (Logged)	0.87	(2.75)
Institutional Expenditures on Academic Support Services (Logged)	-0.94	(0.90)
Institutional Expenditures on Student Support Services (Logged)	0.32	(1.31)
Percent of Student Body Receiving Federal Pell Grant Aid	-2.47	(1.79)
Percent Minority of Freshmen Class	-0.18**	(0.07)
Percent Male of Freshmen Class	-0.21**	(0.07)
Year 1998	0.048	(0.68)
Year 1999	-0.85	(0.71)
Year 2000	0.53	(0.75)
Year 2001	0.52	(0.87)
Year 2002	1.54	(0.95)
Year 2003	2.45*	(1.02)
Year 2004	3.51**	(1.10)
Year 2005	3.89***	(1.16)
Year 2006	4.50***	(1.27)
Year 2007	4.70***	(1.39)
Year 2008	4.88**	(1.49)
Constant	30.9	(32.32)
N	6542	
Groups	556	
R-sq	0.78	
Rho	.74	

Notes:
* p<0.05, ** p<0.01, *** p<0.001
Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Asian Students

Table 5.49: Fixed Effects Model with Interactions by Carnegie Type

	β	Robust Standard Error
Structural Racial Diversity	0.18	(0.23)
Structural Diversity X Master's	0.21	(0.28)
Structural Diversity X Baccalaureate College	0.72	(0.50)
N	6542	
Groups	556	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Research Universities
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Asian Students

Table 5.50: Fixed Effects Model with Interactions by Commuter Status

	β	Robust Standard Error
Structural Racial Diversity	0.17	(0.26)
Structural Diversity X Prim Commuter	0.31	(0.32)
Structural Diversity X Prim Non-Commuter	0.43	(0.43)
N	6542	
Groups	556	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Highly Non-Commuter
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Asian Students

Table 5.51: Fixed Effects Model with Interactions by Institutional Selectivity

	β	Robust Standard Error
Structural Racial Diversity	-0.35	(0.23)
Structural Diversity x Non Comp	.16	(0.59)
Structural Diversity x Less Comp	.91	(0.58)
Structural Diversity x Comp	.90**	(0.32)
Structural Diversity x Very Comp	.70	(0.38)
Structural Diversity x Highly Comp	1.28**	(0.40)
N	6542	
Groups	556	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Most Selective
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Asian Students

Table 5.52: Fixed Effects Model with Interaction by Institutional Control

	β	Robust Standard Error
Structural Racial Diversity	0.54*	(0.23)
Structural Diversity x Private	-0.24	(0.30)
N	6542	
Groups	556	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Public Institutions
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Asian Students

Table 5.53: Fixed Effects Model with Interaction by Institutional Size

	β	Robust Standard Error
Structural Racial Diversity	0.51	(1.44)
Institution Size (Logged)	1.80	(12.39)
Structural Diversity x Log Size	-0.013	(0.16)
N	6542	
Groups	556	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Asian Students

Table 5.54: Fixed Effects Model with Interaction by MSI

	β	Robust Standard Error
Structural Racial Diversity	0.42*	(0.20)
Structural Diversity x MSI	-0.076	(0.83)
N	6542	
Groups	556	
R-sq	0.78	

Notes:
* p<0.05, ** p<0.01, *** p<0.001; Non-standardized beta weights shown, robust standard errors in parentheses
Omitted Group: Non MSIs
Dependent Variable: Overall Institution Six-Year Graduation Rates of All Asian Students

Racial Diversity & Institutional Asian Student Six-Year Graduation Rates

The final models run in this chapter explored how student body racial diversity influenced the institutional graduation rates of Asian students. Table 5.48 shows that the initial results of this estimation found that a one unit increase in an institution's racial diversity score was correlated with a .41 point increase that institution's Asian graduation rate ($\beta = .41$ $p = .042$). As with previous models, the effect size of this statistically significant coefficient was small ($f^2 = .018$). In examining the results of the fixed effects models which included interaction terms (Tables 5.49-5.54[28]), only the interaction between student body racial diversity and selectivity was found to be statistically significant $F(5, 555) = 3.02$, $p = .01$ in relation to Asian student graduation rates. As with other models, the significant difference was between highly competitive and most competitive institutions. Competitive institutions were also found to be significantly different than most competitive institutions.

In summary, the relationship between student body diversity on institutional race-specific graduation rates does appear to be different. For institutional overall Minority, African American, and Asian student graduation rates, increased diversity appeared to have a positive association. Institutional White student graduation rates and Hispanic student graduation rates were largely uncorrelated with student body racial diversity.

Review of Chapter and Data Analysis

Chapter V presented statistical findings related to research questions four through seven of this study which sought to better understand the relationship between

[28] A model interacting diversity with HBCU status with regard to Asian student graduation rates was not run because only one HBCU had an average freshmen enrollment of over 10 Asian students over the 12 years in which data were collected for this study.

undergraduate student body racial diversity and institutional six-year graduation rates. The chapter was separated into 3 parts. In part one, a detailing of the data cleaning techniques used to obtain the analytic groups for this section of the study was presented. In part two, summary statistics were presented for each of the variables used in this study, including race-specific institutional graduation rates. The final part of this chapter detailed the results of the regression analyses run to determine how student body racial diversity was associated with institutional graduation rates. As in Chapter IV, the initial regression analyses run in this section suggested that the most robust estimations of the relationship between diversity and institutional graduation rates were generated from models using institutional and year fixed effects. Therefore, the bulk of the analyses reported in this chapter were from fixed effects models.

The results of these regression analyses showed some differences across model specification. In examining overall institutional graduation rates, it was found that structural racial diversity does not have a statistically significant influence on graduation rates. In examining race-specific institutional graduation rates, however, it was found that changes in student body racial diversity were positively correlated with institutional overall Minority student graduation rates, African American student graduation rates, and Asian student graduation rates. Though statistically significant, the effect size of diversity with regard to its association with these group specific graduation rates was consistently small. No statistically significant relationship was found between student body diversity and institutional White student graduation rates or Hispanic student graduation rates. In no specification did diversity have a statistically significant negative direct relationship with institutional graduation rates.

Further analyses suggested that institutions with certain characteristics may be affected differently by student body racial diversity with regard to its relationship with institutional graduation rates. In several estimations, both institutional selectivity and institutional size were found to have significant interactive effects. The influence of diversity on graduation rates was found on several occasions to be more positive at highly competitive institutions as compared to most competitive institutions of higher education. Models including statistically significant size-diversity interactions consistently found that larger institutions were more positively influenced by diversity than smaller institutions of higher education. In models examining overall graduation rates and White student graduation rates, the interaction between commuter status and diversity was found to be statistically significant. In each of these estimates, primarily commuter institutions were more positively influenced by diversity than highly non-commuter institutions. In models examining overall Minority student graduation rates and African American student graduation rates, the interaction between diversity and both MSI status and HBCU status was either statistically significant or very close to statistical significance. These findings suggest that at institutions with higher levels of Minority enrollment, changes in student body racial diversity may not have as positive an association with institutional Minority and African American graduation rates as compared to institutions with lower levels of Minority enrollment.

In conclusion, the results displayed in Chapter V suggest that the relationship between student body racial diversity and institutional graduation rates is very nuanced. Chapter VI presents a full analysis of the findings from Chapter IV and Chapter V of this study.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The goal of this study was to examine the relationship between student body racial diversity and institutional freshmen retention rates and institutional six-year graduation rates. This chapter summarizes the findings of this study and analyzes the implications of these findings with regard to research and practice in higher education. The chapter begins with a review of the research project including the study's purpose, procedures, and findings. This is followed by a discussion of the findings in relation to both previous research on diversity in higher education and organizational theory related to organizational racial composition. The chapter concludes with a discussion of the implications of this research, suggestions for future research, and a discussion of the study's limitations.

Review of Study

Over the past 20 years, a substantial body of research has accumulated examining the impact of racial and ethnic diversity among college students in American higher education. For the most part, this literature has found that increased student interactions with diversity are positively associated with students' overall satisfaction with college, their intellectual self-concept, and a broad range of other student social and learning outcomes (Gurin, 1999; Hurtado, et al., 2003; Milem, 2003).

One outcome that has received surprisingly little consideration among scholars studying college and university racial diversity is college student dropout. Only a few empirical studies (Carter, 1999; Titus, 2004; L. Tsui, 1995) have attempted to examine how student interactions with diversity impact the likelihood of student degree completion while virtually no research has attempted to explore the direct relationship between college and university student body racial composition and institutional retention and graduation rates. This dearth of literature, especially with regard to the direct effect of student body racial diversity on institutional retention and graduation rates, limits the higher education community's full understanding of the educational impact of student body racial diversity. In an attempt to fill this research void, the purpose of this dissertation was to examine the correlation between student body racial diversity and freshmen retention and six-year graduation rates of American four-year colleges and universities.

The theoretical frameworks used to ground this project came primarily out of research in organizational studies which attempts to explain the impact of diversity on various organizational outcomes. The first, social categorization theory, suggests that in an organizational setting individuals will often self-categorize themselves based on salient individual characteristics such as age, gender, race, and ethnicity (Turner, et al., 1987; K. Williams & O'Reilly, 1998). This self-categorization often leads to "in-group" vs. "out-group" confrontation which is predicted to decrease organizational effectiveness in some areas, including organizational turnover. Previous research grounded in the social categorization theory has found that more diverse organizations experience higher levels of organizational turnover (Crocker & Major, 1989; Moreland, 1985; Pelled, 1996;

Pelled, et al., 1999; Riordan & Shore, 1997; Triandis, et al., 1994). Given the parallels between organizational turnover and student body retention and graduation rates, it was hypothesized that colleges and universities with higher levels of racial diversity would have lower retention and graduation rates.

Similarly/attraction theory, a second theoretical framework used to better understand organizational racial diversity, leads to similar hypotheses as social categorization theory. Similarity/attraction theory suggests that individuals prefer to interact with others who are similar to them due to the fact that interactions with similar individuals are more pleasurable, lead to faster rapport, and are validating for an individual's values and opinions (Williams & O'Reilly, 1998). As a result, heterogeneity in organizations has been found to intensify organizational conflict, reduce individual satisfaction, and, of particular importance to this study, increased employee turnover (Horwitz, 2005; Jehn, et al., 1999; Pfeffer, 1983; A. Tsui & O'Reilly, 1989). Again, with regard to this project, this theory would predict that higher levels of student body racial diversity adversely affect freshmen retention and graduation rates.

A concept which may help predict the impact of student body racial diversity on institutional retention and graduation rates is "residentiality". Because going to college often involves a student leaving membership in one culture and incorporation into another culture, many suggest that institutions should engage in activities which help students fully integrate into the social community of their campus environment if they hope to increase their retention and graduation rates (Astin, 1975; Braxton & McClendon, 2001-2002). One method colleges and universities may use in their attempt to create this residentiality among students is the enrollment of a racial homogenous student body.

Because many students come to college from racially segregated backgrounds with regard to their neighborhoods and secondary schools (Frankenberg, et al., 2003), colleges and universities with racially homogenous student bodies may reduce the amount of "transition shock" and increase the level of residentiality among the majority of students enrolling in their institution. This may subsequently increase institutional retention and graduation rates. Therefore, institutions with higher levels of student body racial diversity may have lower retention and graduation rates.

In an attempt to examine the hypotheses generated from these theories and concepts, this research study was developed using institutional data primarily from IPEDS, the Carnegie Classification of Colleges and Universities, and the Barron's Profile of American Colleges and Universities. To examine the influence of student body racial diversity on institutional freshmen retention rates controlling for other factors, data on over 1,215 institutions of higher education over 5 years were collected and analyzed using yearly OLS and fixed effects regression models. To examine the influence of student body racial diversity on institutional six-year graduation rates controlling for other factors, institutional data were collected over 12 years and again analyzed using yearly OLS and fixed effects regression models. The number of institutions used to examine graduation rates was dependent on whether race-specific graduation rates were used as the dependent variable. The results of these analyses are presented below.

Relationship between Student Body Diversity & Freshmen Retention Rates

After comparing the initial results of the yearly OLS regression model and estimations which included year and institutional fixed effects, it was evident that the

fixed effects model provided a more robust estimation of the relationship between student body racial diversity and institutional freshmen retention rates. The results of these fixed effects estimations found student body diversity to be positively related to institutional retention rates. With regard to research question 1, a one unit increase in an institution's structural racial diversity score was correlated with a .19 point increase in institutional retention rates. Both the effect size and the magnitude of this coefficient, however, were small. The Cohen's f^2 effect size of student body racial diversity was .0211. With regard to magnitude, because the average institution of higher education in this dataset had a 1.759 difference between their minimum and maximum structural diversity score over the five years studied, the average institution would have only seen a .3344 point increase in the freshmen retention rates due to increased racial diversity among their student body.

Subsequent estimations found that this small positive relationship between diversity and retention was not conditional on institutional characteristics. With regard to research question 2, none of the interaction models estimated were found to be statistically significant, meaning that the positive relationship between student diversity and institutional retention rates was not conditional on characteristics such as institutional type, institutional commuter status, institutional selectivity, and institutional control. The interaction between student body racial diversity and institutional size was found to be approaching statistical significance, suggesting that the relationship between racial diversity and institutional retention rates may be less at smaller institutions than at larger institutions of higher education.

Finally, one of the goals of this project was to examine whether the association between diversity and retention rates was different at Minority serving institutions (MSIs)

and predominantly White institutions (PWIs) as noted in research question 3. Models run to examine this relationship were not statistically significant, suggesting that these groups of institutions were similarly influenced by changes in student body racial diversity.

Relationship between Student Body Diversity & Six-Year Graduation Rates

The second part of this study focused on the relationship between student body diversity and institutional six-year graduation rates. The results provided some interesting insight into the nuances of this relationship. Using the fixed effects regression models to address research question 4, it was found that changes in student body racial diversity were not significantly related to overall institutional graduation rates. Interaction models estimated to address research questions 5 and 6, however, suggest that this relationship may be different at different types of institutions. The overall graduation rates of institutions with more commuter students were significantly more positively influenced by increases in student body diversity than institutions with a higher percentage of students living on campus. At the "most competitive" colleges and universities, it was found that increases in diversity were negatively related to institutional graduation rates. This was significantly different than "highly competitive" and "very competitive" institutions, where diversity was positively correlated with overall graduation rates. The association between racial diversity and institutional graduation rates was also found to be significantly more positive at larger institutions of higher education as compared to small institutions.

Due to the availability of race-specific graduation rate data, analyses to address research question 7 were run to determine if the graduation rates of specific racial groups

were influenced differently by changes in student body racial diversity. The results suggested that indeed race-specific institutional graduation rates were affected differently.

With regard to institutional Minority graduation rates, student body racial diversity was found to have a small, statistically significant positive correlation. A one unit increase in institutional structural racial diversity score was correlated with a .34 point increase in institutional graduation rates. This relationship was found to be significantly conditional on institutional selectivity ("most competitive schools" were less positively influenced) and HBCU status (HBCUs were less positively influenced).

Institutional White student graduation rates were found to be largely unaffected by changes in student body racial diversity. This relationship, however, was also found to be conditional on institutional commuter status and selectivity. White student graduation rates at highly non-commuter institutions were found to be adversely influenced by increased student body diversity while White student graduation rates and primarily commuter institutions appeared to be positively correlated with increased student body racial diversity. The interaction between selectivity and racial diversity again revealed/indicated that "most competitive" institutions of higher education were more negatively influenced by changes in student body racial diversity than "highly competitive" and "very competitive" institutions with regard to White student graduation rates.

Models using African American student graduation rates as the dependent variable found changes in student body racial diversity to have an overall positive association with graduation rates. This result was found to be conditional on institutional

size. As before, structural racial diversity was found to have a more positive influence on African American graduation rates at larger institutions of higher education. Though only approaching statistical significance, the results here also suggest that MSI and HBCU African American student graduation rates may be adversely affected by increased student body diversity.

Hispanic student graduation rates were found to be unaffected by institutional student body racial diversity. Neither the main effects models nor the interaction models were found to contain any statistically significant variables of interest. Asian student graduation rates, on the other hand, were indeed found to be positively related to increased student body racial diversity. A one unit increase in student body racial diversity was found to have a .41 point influence on institutional Asian student graduation rates. As with the other model, the interaction between selectivity and racial diversity in relation to institutional Asian student graduation rates found that "most completive" institutions of higher education were more negatively influenced by changes in student body racial diversity than "highly competitive" institutions.

Situating the Findings in the Context of Previous Higher Education Research

As noted in Chapter II of this dissertation, previous research on the impact of student body racial diversity on institutional retention and graduation rates has been scarce and inconclusive. Among these few studies, some such as those from Pascarella and Terenzini (1991), Chang (1996), and Carter (1999), have suggested that students attending institutions with greater Minority enrollments have higher rates of persistence while others including Astin (1993), Tsui (1995), and Titus (2004) have found that

attending more diverse institutions of higher education is unrelated to or can adversely impact retention and graduation rates. The findings from this study in general support the first group of scholars. Increases in student body racial diversity were positively correlated with institutional freshmen retention rates. While this relationship was rather small, it does suggest that diversity can have a direct positive influence on institutional freshmen retention rates, controlling for other factors.

Whether this positive relationship is being driven by increased Minority student graduation rates is difficult to address given the limitations of the retention rate variable used for this study. The aforementioned research which found a positive relationship between retention and diversity noted that this positive impact was primarily found among Minority students (Carter, 1999; Pascarella & Terenzini, 1991). It could be the case here that increased student racial body diversity has a positive association with the freshmen retention rates of Minority students but no significant association with the graduation rates of non-Minority students. Without race-specific retention rate information, however, this cannot be statistically tested in this study.

The speculation about Minority student retention rates potentially being the primary driver of the positive relationship between diversity and retention rates is even more salient when exploring the relationship between diversity and institutional six-year graduation rates. Overall institutional graduation rates appeared to be largely unaffected by changes in student body racial diversity. Institutional overall Minority student graduation rates, African American student graduation rates, and Asian student graduation rates, however, each appear to be positively related to higher levels of student body racial diversity. These findings are consistent with the work of previous researchers

who, as mentioned earlier, have found student body diversity has its strongest impact on the persistence of Minority students (Carter, 1999; Pascarella & Terenzini, 1991). The findings from this study that institutional White student graduation rates are unaffected by changes in diversity is also consistent with the research of Carter (1999) and Tusi (1995) who each found the degree aspirations of White students not to be significantly related to higher levels of student body diversity.

Perhaps the most important contribution of this research is the fact that it is the first study to examine whether the influence of structural diversity on institutional retention and graduation rates is conditional on other institutional characteristics. The results suggest that student body racial diversity has a much less positive association with retention and graduation rates at smaller, more residential, very highly selective institutions of higher education. Increased student body racial diversity also appeared to have a negative association with graduation rates at MSIs and HBCUs. These characteristics (smaller enrollment, more students living on campus, HBCU status, etc.) are traits of colleges and universities that have strong single, unitary organizational cultures (Cameron, 1978; Saffold III, 1988; Smart & St John, 1996). Therefore, the findings of this study suggest that increased student body racial diversity among institutions of higher education with the characteristics of strong unitary organizational cultures may have a negative influence on institutional retention and graduation rates. This idea is further discussed in the following section.

One other interesting finding from this research was the fact that institutional freshmen retention rates were positively associated with increased student body racial diversity while institutional six-year graduation rates were, in the aggregate, unrelated to

increased racial diversity. Any theorizing or hypothesizing about this finding, however, should be done with caution give the construction of this dataset. The analyses of freshmen retention rates and six-year graduation rates used a different sample size and the length of the panel data sets created for each group was different. Therefore, any comparisons between the two data sets would be spurious. Nevertheless, this finding does suggest the need for research examining whether diversity in higher education, whether from an organizational perspective or a student interaction perspective, has a different influence on student early retention rates verses graduation rates.

Situating the Findings in the Context of Organizational Theory

In Chapter III of this dissertation, research hypotheses as implied by social categorization theory, similarity-attraction theory, "residentiality", and previous research on the educational impact of student body racial diversity were presented for each of the study's primary research questions. These hypotheses are revisited below and discussed in relation to the findings of this study.

Hypothesis for Research Questions 1 and 4: Colleges and universities with higher levels of student body racial diversity should have lower overall freshmen retention and six-year graduation rates, ceteris paribus.

Contrary to the tenets of the aforementioned theories, there did not appear to be a negative relationship between student body racial diversity and overall institutional retention and graduation rates. Diversity was actually positively related to institutional freshmen retention rates and showed no statistically significant relationship with overall

institutional six-year graduation rates. As noted below, however, this relationship appears to be very much conditional on salient institutional characteristics.

Hypothesis for Research Questions 2 and 5: The relationship between student body racial diversity and college/university retention and graduation rates will be conditional on institutional type and size.

Models predicting the influence of diversity on institutional retention and graduation rates conditional on institutional type and size found strong evidence that institutions with the characteristics of strong, unitary organizational cultures are more negatively influenced by changes in diversity than other types of institutions of higher education. This finding is different from previous research on the impact of diversity on organizational turnover which found that a strong, collectivistic organizational culture which fosters salient shared identity may reduce the negative impact of diversity on organizational turnover (Chatman, et al., 1998; O'Reilly & Chatman, 1996). In other words, this research suggests that a strong organizational culture may have a negative moderating effect on the relationship between diversity and organizational turnover in higher education as opposed to a positive moderating effect as found in research on the relationship between diversity and organizational turnover in for-profit businesses and organizations.

The reason for this negative moderating effect is difficult to determine without further research. We can, however, speculate as to why institutions with very strong organizational cultures appear to be more negatively affected by changes in student body racial diversity. One possible explanation revolves around Minority student graduation

rates. Institutions with very strong unitary organizational cultures are likely to be institutions with a history of homogeneous student bodies with regard to race, ethnicity, SES, etc. Because of these histories, these institutions may not have had to develop the support services needed to ensure the social and academic success of Minority students such as cultural centers, early intervention programs, and mentoring programs (Seidman, 2005b; Swail, et al., 2003) Therefore, as these institutions increase their enrollment of Minority students, they may experience lower graduation rates among those students due to the lack of institutional support they are able to provide these newly enrolled students of color. This could result in these institutions being more negatively influenced by increased student body diversity when compared to larger institutions with more of a history of diversity.

A second possible explanation revolves around the retention and graduation rates of White students. Within the study of organizational culture in higher education, Burton Clark's (1972) concept of the organizational saga looms large. Clark defines the organizational saga as "a collective understanding of a unique accomplishment based on historical exploits of a formal organization, offering strong normative bonds within and outside the organization" (1972, p. 178). This saga is believed to increase institutional loyalty among students and subsequently may increase institutional retention and graduation rates. These salient organizational sagas are more likely to be developed at small, residential, highly selective institutions due in large part to the shared values and backgrounds of the students, faculty, and administrators of these colleges and universities (Clark, 1971; Tierney, 1988). Therefore, many smaller, likely racially homogenous institutions of higher education may benefit from the strength of their organizational saga

with regard to their retention and graduation rates. The introduction of students with diverse background and values into institutions with salient organizational sagas could reduce the strength of this saga and in turn reduce the institutional commitment of students who strongly identify with the institution's saga. In the case of PWIs, this would likely occur among White students. Therefore, increased racial diversity may lead to lower White student retention and graduation rates and therefore lower overall institutional retention and graduation rates.

These are just two of a wide range of potential explanations of the moderating effect of institutional characteristics on the relationship between student body racial diversity and institutional retention and graduation rates. Developing a valid explanation of this interactive effect was well beyond the scope of this study. What is important is the fact that this research has found that the relationship between student racial diversity and institutional retention and graduation rates is not generalizable across institutions. Institutions with different characteristics such as student selectivity, enrollment size, and percentage of students living on campus appear to be impacted differently by changes in student body racial composition. Therefore, the application of social categorization or similarity-attraction theories to the diversity/dropout association in higher education must account for these conditional relationships.

Hypothesis for Research Questions 3 and 6: The relationship between student body racial diversity and college/university retention and graduation rates will be different at PWIs and MSIs.

The results of this study confirmed this research hypothesis. With regard to freshmen retention rates, PWIs and HBCUs were similarly affected by changes in student body racial composition. With regard to six-year graduation rates, however, differences emerged. Among PWIs, several estimations found that increases in racial diversity had no statistically significant association with institutional White student graduation rates. Increased diversity among PWIs did appear to have a significant positive influence on institutional Minority student graduation rates. This finding can be explained using the theoretical framework of this study. Both social categorization theory and similarity-attraction theory assert that individuals are more likely to be retained within an organization if they are able to associate more with individuals from their own racial/ethnic group within the organization. As more Minority students enroll within a PWI, students of color may be able to more easily find individuals with similar values and backgrounds with whom to associate. Creating this ease of association for non-White members of a PWI could increase organizational performance and reduce organizational turnover among Minority students, as demonstrated by the findings of this research.

The concept of residentiality also provides an explanation for this finding. As PWIs increase their Minority student enrollment, new students of color coming into the organization may experience less of a transition "shock" in their integration into campus life. As mentioned earlier, many Minority students enter college from racially homogeneous neighborhoods and secondary schools (Frankenberg, Lee, & Orfield, 2003). Therefore, integrating into a campus with a very different racial composition than what they have been previously exposed to can be difficult for Minority students. As

PWIs become more racially diverse, it may become easier for Minority students to make this transition and increase their likelihood of being retained at the institution.

Among MSIs, institutional White student graduation rates were found to be unaffected by changes in student body racial diversity. Minority student graduation rates, however, were found to be negatively related to student body racial diversity at MSIs in several models. One explanation for this could be related to the strong organizational culture idea detailed earlier in this chapter. MSIs, especially HBCUs, are renowned for their distinctive organizational culture which often create strong, salient organizational sagas (Butler, 1977; J. Williams, Ashley, & Rhea, 2004). This saga is in large part based on the racial composition of these institutions. Many Minority students, for example, chose to attend MSIs due to their desire to be in an educational environment with other students of color and to learn more about their own racial/ethnic culture (Freeman, 1999). This strong unitary organizational culture could be compromised by increased diversity (i.e., the increased enrollment of White students) at these institutions and that could be leading to lower institutional commitment among students of color. This could potentially be the driving force behind the negative relationship between diversity and graduation rates among Minority students at MSIs.

Hypothesis for Research Question 7: Institutional race-specific graduation rates would be affected differently by changes in student body racial diversity.

Race-specific institutional graduation rates did appear to be affected differently by changes in student body racial composition. Among the entire analytic group used in this study, institutional White student graduation rates and Hispanic student graduation rates

were largely unaffected by changes in student body racial composition. Overall Minority student graduation rates, African American student graduation rates, and Asian student graduation rates were found to be positively correlated with increased racial diversity. These relationships, however, were often conditional on other organizational characteristics, as detailed earlier. Therefore, while the theoretical framework of this study accurately predicts that race-specific graduation rates would be affected differently by diversity, it is important to note the nuances in these relationships.

Overall, the findings of this research did not entirely support the tenets of social categorization theory, similarity-attraction theory, and residentiality. The proposition that overall institutional retention and graduation rates would be negatively affected by increased student body racial diversity was not supported. This finding, however, was conditional on a number of salient institutional factors such as selectivity and the percentage of students living on campus. Many of these conditional effects were supported by the aforementioned theoretical framework. This result is not entirely surprising given the tendency of theory to succeed in predicting some finding but be unsuccessful in predicting others.

Implications for Practice

Despite challenges to race-based admission policies, colleges and universities continue to look for ways to increase the racial and ethnic diversity of their student enrollments. Much of this desire to diversify is based on the belief among administrators that student body racial diversity brings a variety of benefits to both students and the institution. The evidence from this research suggests that one of these benefits could be

increased retention and graduation rates. Some colleges and universities may be able to leverage the racial composition of their school into slightly higher retention and graduation rates. Given the importance of institutional retention and graduation rates to college rankings and other measures of institutional prestige (Standifird, 2005; Volkwein & Sweitzer, 2006), increased student body racial diversity may have the ability to indirectly increase some institutions' reputations and in turn produce benefits such as increased enrollment.

Not all institutions, however, are likely to benefit similarly from increased student body racial diversity. Therefore, it is important for administrators of colleges and universities to critically assess their organizational culture and environment as they seek to pursue increased diversity. Institutions that have smaller enrollments, that are highly non-commuter, and that are considered "most selective" in the nation should carefully consider whether their culture is conducive to the success of students of color. Does the institution have academic support services in place that identify Minority students' needs early? Are mechanisms for social integration such as cultural centers and Minority student organizations available on campus? Institutions which cannot answer yes to these questions may find that increased student body racial diversity can adversely impact their retention and graduation rates. The results of this project suggest that institutions of higher education must consider their unique institutional attributes if they are to benefit from increased student body racial diversity.

This research also has important implications for the future of HBCUs. Statistics have shown that more non-Black students are being recruited to attend HBCUs (Conrad, Brier, & Braxton, 1997; Shalash, 2010). The results of this study suggest that this

diversification could have a negative influence on HBCU retention and graduation rates. Therefore, as administrators of HBCUs increase their overall student body racial diversity, they should carefully monitor how these changes can impact student retention and engage in programs that work towards reducing the dropout rates among both Black and non-Black students.

Directions for Future Research

The findings of this study present interesting opportunities for further research into this and other related topics. To begin, more detailed analyses of the findings of this study should be explored. The results of this project found that the relationship between diversity and institutional retention and graduation rates may be conditional on institutional characteristics. What could not be determined in this study was why certain institutions are impacted differently by changes in student body racial composition. More qualitative and mixed methods research should be conducted to address this question. For example, students from small, residential institutions and students from larger, more highly commuter institutions should be interviewed with the focus of examining if the two groups of students have different perceptions of diversity and the impact of diversity on their commitment to their institution. Further examination of the moderating impact of organizational culture on the relationship between diversity and institutional retention and graduation rates should also be examined. Organizational culture is a latent construct which can be measured in a variety of ways. A more complete measure of this concept in relation to diversity and student departure would help solidify the findings of this research and provide the higher education community

with further evidence of the conditional relationship between diversity and institution retention/graduation rates.

This study adds to the current literature on racial diversity in higher education by examining its relationship with an important organizational outcome (student organizational departure). Other elements of organizational turnover should also be examined in relation to institutional diversity. Future studies should examine how diversity impacts faculty and administrator departure in colleges and universities. The impact of diversity on student, faculty, and administrator recruitment should also be studied. Organizational turnover involves both gains and losses of individuals. Therefore, the fully understand the association between diversity and organizational turnover in higher education we must study both the recruitment and departure of students, faculty, and administrators.

Research on the influence of organizational racial composition on other college/university outcomes should also be pursued in light of this study. Colleges and universities are multiple-goals organizations. Therefore, it is important to develop a further understanding of how changes in organizational racial composition impact the many goals pursued by colleges and universities. Potential projects along these lines include studies on the impact of student body racial composition on institutional attractiveness, institutional reputation and perception, and institutional fundraising. Research could also look at how racial composition impacts organizational decision making and whether increasing diversity changes the organizational culture of a college or university. The bulk of the research to this point on diversity in higher education has focused primarily on student interactions with diversity and how these interactions

impacts student level outcomes. Future research should look to pursue this relationship from a more macro-organizational perspective.

Limitations

In Chapter III of this dissertation, several study limitations were presented. It is worth repeating some of these limitations here to reiterate the fact that the results of this study should be accepted with some caution. Some measures used for control variables such as institutional selectivity and institutional residentiality were not ideal for several reasons. In addition, the accuracy of the regression estimations generated in this study is in large part conditional on the accuracy with which institutional data were reported to IPEDS, the Carnegie Foundation, and the US Department of Education. If the information reported to these agencies is inaccurate, the models estimated in this study may be invalid.

Though the primary analyses of this study come from statistical models using panel data with year and institutional fixed effects, omitted variables could threaten the validity of the results presented here. As noted, however, it is believed that the design of this study effectively reduces the treat of omitted variable bias. The research design and statistical methodologies employed in this study also prevent the identification of a truly causal effect among the variables of interest in this study.

A final important limitation to note is related to the fact that in models estimating the influence of diversity on race-specific retention and graduation rates, several institutions were dropped due to extremely low enrollments of a particular race of students. Ideally, the same set of institutions would have been used for each analysis in

order to make across institutional comparisons easier. Doing this, however, would have severely limited the overall sample size used for this study. Therefore, it is believed that the data cleaning techniques used in this study were the best way to obtain an estimation of the diversity/race-specific graduation rate relationship that was as unbiased as possible.

Conclusions

Despite these limitations this study makes an important contribution to our understanding of the relationship between institutional racial diversity and an institution's ability to retain and graduate students. While the main effects suggest that diversity has a small positive association with institutional freshmen retention rates and no statistically significant association with institutional six-year graduation rates, interaction effects indicated that the relationship between racial diversity and institutional student departure rates is very nuanced. It is hoped that this study will help inform institutional policy with regard to student diversity and spark debate, dialogue, and most importantly future research on diversity in higher education. It is believed that this dialogue and research will help the higher education community better understand how diversity can be used to improve American colleges and universities.

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