THE RELATIONSHIP BETWEEN SOUTH CAROLINA'S MERIT-BASED FINANCIAL AID AND COLLEGE COMPLETION

by

ASHLEY CLAIRE BURNSIDE

(Under the Direction of

Robert K. Toutkoushian)

ABSTRACT

The decrease in financial support to higher education from state governments over time has necessitated changes to more targeted funding models, as has happened in states like South Carolina. These models are necessary to meet states' increased fiscal demands, such as support for K-12 education and healthcare, while continuing to optimally serve the citizenry. For nearly two decades, merit-based aid has been a politically popular solution to curbing monetary shortfalls, while simultaneously incentivizing academic achievement. However, such incentive may not always yield increased access and equity. This study seeks to examine the relationship between merit-based aid and academic program completion, and identify other factors likely to impact student graduation rates in South Carolina.

This quantitative analysis is conducted using year-specific regression models to analyze student-level data from 2002-2012 from the South Carolina Commission of Higher Education (SCCHE) and a logistic regression to examine the 2012-2013 freshman cohort at a mid-sized public university. Through this work, I studied the correlation between college completion and my primary indicator of interest, receipt of one of South Carolina's three merit-based aid awards,

to determine if being a merit-based aid award recipient has a positive association with completion. I establish through multinomial logit regressions that there is a significant and positive relationship between completion and merit aid. Positive relationships among other factors on completion, such as institution type, gender, race, and socioeconomic group, are not uniformly seen.

INDEX WORDS: merit-based aid, college completion, South Carolina, 4-year colleges, 2-year colleges, year-specific regression, multinomial logit, logistic regression

THE RELATIONSHIP BETWEEN SOUTH CAROLINA'S MERIT-BASED FINANCIAL AID AND COLLEGE COMPLETION

by

ASHLEY CLAIRE BURNSIDE

B.A., Winthrop University, 2008

M.A., University of South Carolina, 2012

M.A.T., Winthrop University, 2015

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF EDUCATION

ATHENS, GEORGIA

2019

THE RELATIONSHIP BETWEEN SOUTH CAROLINA'S MERIT-BASED FINANCIAL AID AND COLLEGE COMPLETION

by

ASHLEY CLAIRE BURNSIDE

Major Professor:	Robert K. Toutkoushian
Committee:	Erik C. Ness
	Gregory C. Wolniak

Electronic Version Approved:

Ron Wolcott
Interim Dean of the Graduate School
The University of Georgia
December 2019

DEDICATION

This research is dedicated to my grandfather, Cameron McDavid Grice. A wonderful partner in crime, he was unwavering in his support, generous with his love, and a solid sounding board for me as a child and young adult. Though it has been many years since his passing, I hope to continue honoring him by living life just as he did: full of grace, curiosity, good humor, and a bit of mischievousness.

ACKNOWLEDGEMENTS

The process of completing this dissertation has been both challenging and humbling. Because of that, I am deeply indebted to a number of people who have walked alongside me throughout this journey. First, I would like to express my deepest gratitude to my major professor, Dr. Robert Toutkoushian. As my quantitative Yoda, Rob's expertise has been invaluable. The time, energy, and patience he has invested in guiding me along have been tremendous. Without him, I could not have gotten this project to a point at which I am proud of the result.

I would also like to extend my sincerest thanks to committee members Dr. Erik Ness and Dr. Gregory Wolniak. Both of these gentlemen were very supportive of the project from the beginning and never failed to provide thoughtful feedback that always served to improve my work. Additionally, much appreciation goes to UGA's Institute of Higher Education faculty, all of whom contributed to the development of my dissertation in one way or another through their classes, recommendations, or personal conversations.

Two people who were instrumental in my pursuit of this degree are Dr. A.J. Angulo and Dr. Karen Kedrowski. Steadfast in their support and guidance over the years, these two have unquestionably given me the courage to push myself further than ever imagined. They are wonderful cheerleaders and I am a stronger, better person for knowing them.

Looking back, I cannot believe my good fortune having gone on this academic adventure with the most phenomenal cohort. It is truly a joy to have gotten to know each member of the

“Fab Five.” I am ridiculously lucky to have the friendship of so many wonderful, talented people.

I continue to be thankful for my friends and Winthrop colleagues, all of whom have been patient throughout this process over the past few years as well.

Lastly, I would like to thank my family for their unconditional love. My brother, Cameron, has always known when to crack a joke, while my parents, Bill and Sally, are my tireless champions. I will never be able to quantify my love for them or express just how deeply I appreciate their commitment to seeing me achieve my dreams.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

Prior to the recession of the early 1990s, the stream of public funds allocated to higher education began to ebb. This pattern has continued even more precipitously postrecovery and in the years that have followed (McPherson & Schapiro, 1998). A significant decline in federal dollars to colleges and universities has thus necessitated state governments and institutional administrations take on a more active role in funding. As happened in many states, South Carolina adopted a lottery-funded, merit-based aid program to compensate. This program created an opportunity to finance higher education initiatives in the state that otherwise would have gone by the wayside due to decreased monies. The only problem is that lottery revenue alone has never been enough to cover the cost of the three awards: (a) Palmetto Fellows, (b) Legislative Incentives for Future Excellence (LIFE), and (c) Helping Outstanding Pupils Educationally (HOPE). The overage passed onto the taxpayer is now well over $80 million dollars, as there has been a ballooning of eligible students (Cope, 2014). Thus, there is a constant conversation among policymakers about accountability: if these programs are effective in positively affecting academic outcomes. Students, families, and some in the field of higher education not only question effectiveness but the ability of the awards to benefit all participants, given the inherent social, cultural, and economic challenges that predate the dispersal of funds to many. As such, I seek to understand the relationship between merit-based aid and college completion and the possible associations that antecedent or institutional factors may have in relation to completion rates.

Diminishing monies, both federal and state, appear to be reflective of not only "increasing claims on the government to fund K-12 and healthcare" (Kinzie et al., 2004, p. 23) but also a "widespread belief that private benefits of higher education supersede public benefits" (Kinzie et al., 2004, p. 45). The significance of this fiscal tightening cannot be overstated, as the contribution of state and local government spending has reached its lowest level since World War II (McPherson & Schapiro, 1998). State governments contributed 45% of all higher education revenues in 1979-1980. By 1992-1993, that contribution fell to 35% and has continued to abate (McPherson & Schapiro, 1998). Because state and local appropriations help keep public tuition low, these funds are pivotal to providing access to marginalized students, particularly those with low incomes. As federal spending has not kept pace with tuition, increases have frequently left substantial funding gaps.

With the change in appropriations came a substantive shift in the public and political discourse surrounding the distribution of publicly funded financial aid (Cornwell & Mustard, 2005; Duffourc, 2006; Dynarski, 2004; Heller, 2006). Financial assistance distributed based on monetary need had long been the favored method of reducing fiscal barriers to tertiary education (Doyle, 2010). Evidence of this commitment could be observed at the federal level with the passage of the Higher Education Act (HEA) of 1965 and the Basic Educational Opportunity Grants in the HEA's 1972 Amendments (Heller, 2006; Heller & Rasmussen, 2001). However, in no longer viewing the nonpecuniary gains, such as improved community health, lowered crime rates, and increased community involvement, as reason enough to fund marginalized students, the burden of paying for a college education transferred to students and their families (Paulsen & St. John, 2002). Because of this shift, questions of access and affordability have been renewed with increased vigor.

The institution of Georgia's HOPE scholarship in 1993 was a response to the access and affordability question. With its introduction, HOPE drove state-level policy shifts from need-based models to merit-based awards that were often more politically advantageous for constituencies that fell in mid-to-upper socioeconomic strata, due to the lack of an income cap (Cornwell & Mustard, 2005; Dynarski, 2004; Heller, 2006). Politically popular, state-level merit aid legislation quickly spread across the country via policy diffusion (Cohen-Vogel, Ingle, Levine, & Spence, 2008; Duffourc, 2006). To date, more than one third of U.S. states have adopted some form of merit aid program, many of which were built in the image of Georgia's HOPE scholarship (Delaney & Ness, 2011). Among the states to adopt such a program was South Carolina.

History and Context of South Carolina's Merit-Based Aid Program

South Carolina's lottery funded merit-based aid program began in earnest during the 2002-2003 academic year. Since then, the scholarship program has consisted of three tiers: (a) the Palmetto Fellows, (b) LIFE, and (c) HOPE. Each of these grants is intended to cover most, if not all, of a student's tuition for in-state institutions and a nominal book allowance. To meet initial eligibility for the scholarships, a student must be a South Carolina resident at the time of high school graduation and college enrollment and enroll as a full-time, degree-seeking student at an eligible college or university. Upon meeting the initial criteria, a student must then meet the distinctive requirements for a particular tier to reap the associated financial incentives (SCCHE, 2019a; 2019b).

Most students who obtain merit-based aid in the state of South Carolina receive the LIFE scholarship. LIFE requires that a student meet two of the three criteria for 4-year assistance: (a) graduate from high school with at least a cumulative 3.0 grade point average (GPA) based on the

South Carolina Uniform Grading Policy, (b) rank in the top 30% of the graduating class based on the Uniform Grading Policy, and (c) score at least 1100 on the SAT (or 24 on the ACT) by June of their senior year. Additional enhancements established by the General Assembly in 2007 can also be reaped by students majoring in math, science, or health fields at a 4-year institution, increasing the total award amount from $5,000 to $7,500 to help meet cost of attendance for up to six consecutive terms (SCCHE, 2019b).

Since the formal inception of the South Carolina Education Lottery on January 7, 2002, the state's General Assembly has allocated over four billion dollars in funding to higher education programs and scholarships (South Carolina Education Lottery, 2018).[1] Almost three and a half billion dollars of that funding has gone to the state's merit-based scholarship and grant programs for students attending 2- and 4-year institutions of higher education (South Carolina Education Lottery, 2018). Given South Carolina's significant investment in its citizenry, it is imperative to examine the relationship between the state's merit-based financial aid program and student academic outcomes to help determine program effectiveness. To gauge the utility of South Carolina's merit-based aid program in a longitudinal context, program completion rates, otherwise known as graduation rates[2], will be studied.

Purpose and Research Questions

The intent of this study is to advance state merit-based aid research by not only examining the seldom-studied state of South Carolina but also placing the development of South Carolina's merit aid program in a larger framework, while simultaneously acknowledging trends

[1] The reporting period is January 7, 2002 to June 30, 2018.
[2] All completion rates were not bounded by the typical 6-year time frame. If a student completed their degree in 2002, their first-degree graduation would be reported until the end of the 2017-2018 academic year. However, if a student completed their degree in 2012, then they too would only have their first-degree graduation reported until the end of 2017-2018.

specific to both institutions and a number of student subpopulations. More specifically, I sought to identify the student subpopulations that have gained the greatest benefits from the subsidy. While I examined all South Carolina's institutions, I paid particular attention to 4-year public institutions, as they enroll the majority of postsecondary students in South Carolina (SCCHE, 2019c).

The study is principally descriptive, using quantitative analysis to identify the strength of associations and trends. This study is not intended to be exhaustive at a macro-level due to data limitations. As such, the analysis does not seek to address effect and instead seeks to answer the following questions:

- Research Question 1: Is there a positive or negative relationship between South Carolina's merit-based aid and academic program completion of students?
- Research Question 2: What other factors are likely to impact student graduation rates in South Carolina?

Conceptual Framework

Before students can complete a program of study, they must first make a choice as to which institution will they enroll. To explain this phenomenon, researchers most frequently invoke rational choice and human capital theories. Human capital theory assumes students are rational beings who will invest in their education because the lifetime of benefits presumably will outweigh the expected direct and indirect costs. Complicating matters is a student's inherent "differential access to information" (Perna, 2006a, p. 106). This makes it difficult to correctly assess an education's costs and benefits. Students' antecedent factors (e.g., gender, race, socioeconomic status) also play a significant part in a state merit-based aid program's levels of success (Lee, 2018). This additional complication highlights human capital theory's "limited

usefulness for understanding sources of differences in college choices amongst groups" (Perna, 2006a, p. 107). That is why Perna's proposed conceptual model was used alongside human capital theory to evaluate student decision-making processes related to state merit-based aid.

Perna's (2006a) model adapts well to this type of study not only due to its ability to address the complexity of multidimensional questions through a unique combination of economic and sociological perspectives but also because the model assumes that decisions indicate a student's "situated context" (Perna, 2006a, p. 116). This means a student's individual habitus, school and community context, higher education context, and broader social, economic, and policy context are all considered alongside human capital theory to explain the multiple paths that students take to reach the same or different end goals (Perna, 2006a). Perna's emphasis on social and cultural capital is particularly pertinent, as much has been made about diversification efforts over the years. Robust studies like this aid in helping to determine the extent to which merit scholarships are helpful or if they merely just re-establish existing biases.

Given the larger merit-aid literature, it is commonly understood that both race and socioeconomic status are linked to unequal levels of access to higher education (Avery & Hoxby, 2004; Conner & Rabovsky, 2011; Goldrick-Rab, Harris, & Trostel, 2009; Leslie & Brinkman, 1987). Such certainly seems to be the case in South Carolina where sharp racial and class divides still exist. For instance, as of 2018, 68.5% of approximately five million inhabitants are White and 27.3% Black (U.S. Census, 2018). Yet, a higher percentage of Blacks than Whites not only live below the poverty line but also make the lowest reported median household income out of all races reported on the U.S. Census (Datawheel, 2019; Statistical Atlas, 2018). By highlighting the incredible variation found amongst programs and their recipients, scholars and policymakers can better recognize the complex nature of an endeavor like providing access to higher education

for a state's best and brightest. Moreover, in researching the influence of differing program structures across the United States, scholars can identify many of the shared aims that would ultimately assist in developing a common typology that could aid the current lack of operationalized and generalizable terms (Delaney & Ness, 2011). Should scholars wish to have a greater influence on policy development and refinement, they must endeavor to not only capture greater nuance, as is the aim here, but also establish a common language to create largely comparable measures. In exploring the variations in South Carolina's merit aid program, it is reasonable to assume that such analysis will evolve and be refined to lead to stronger empirically supported conclusions.

Methods

The data analyzed in this study were taken from two sources. I first conducted a quantitative analysis using multinomial logits on 320,015 individual student observations from the SCCHE's Commission on Higher Education Management Information System (CHEMIS) dataset for the years 2002-2012. This analysis provided a broad survey of state-level effects. The examination centered on whether South Carolina's merit-based aid recipients are more or less likely to graduate from a state, 2- or 4-year program. I endeavored to determine what, if any, distinctions exist between completion rates based upon antecedent characteristics, such as gender, race, and institutional typology.

To investigate phenomena occurring at the institution-level, a second quantitative analysis was completed. This investigation used an original dataset composed of 1,051 unique student observations from a mid-size, state institution following student completion for the 2012-

2013 freshman cohort.[3] In using a micro-approach in the latter analysis, I could better examine economic and sociological contributors shaping the college choice process.

Conclusion

It is my hope that by evaluating both the big and small picture of the association between merit-based awards and completion, both scholars and policymakers can supplement their existing knowledge, particularly on the impact of legislative choices, and recognize the intersectional nature of some of the program's underlying attributes. Furthermore, this study contributes to the research on the relationship between merit aid and degree completion. To understand the real impact of merit aid through a student's entire postsecondary experience, researchers must examine whether the award actually makes a difference.

[3] A unique dataset composed of institutional records and National Student Clearinghouse data was provided by an individual institution for the micro-level analysis. This dataset included variables, particularly socioeconomic, that were not provided at the state-level via CHEMIS. Thus, why CHEMIS data alone was not used. Given the receipt of potentially sensitive student-level data, even though de-identified, the analysis was approved with the understanding that the institution's name would remain confidential.

CHAPTER 2

LITERATURE REVIEW

Since the introduction of Georgia's HOPE scholarship in 1993, a substantive shift in policy has occurred in the way that many states distribute publicly funded financial aid to reduce monetary barriers to higher education (Cornwell & Mustard, 2005; Doyle, 2010; Duffourc, 2006; Dynarski, 2004; Heller, 2006). More politically advantageous merit-based awards that made greater in roads amongst the middle- and upper-class electorate supplanted need-based awards, the long-favored option in increasing access to postsecondary instruction. During the 2015-2016 academic year alone, the National Association of State Student Grant and Aid Programs (NASSGAP) reported $4.5 billion was awarded to undergraduate students via state programs that included a merit criterion (NASSGAP, 2017). Given such significant investment on the part of individual states, it is important that the relationship of merit-based financial aid programs to student outcomes be examined to determine the current landscape of these programs more generally, and, to ascertain the aid programs' strengths and deficiencies. While state merit scholarships have made for good political rhetoric and appeased many constituencies, it is imperative to know if such a sizable public investment is both effective and efficient.

This literature review provides not only a broad overview of the applicable literature in this growing area of higher education and help to determine policy implications but also discusses the influence of merit-based aid on student outcomes including enrollment and completion. This study will advance state merit-based aid research by placing the development of South Carolina's program in a larger context, in addition to helping scholars and policymakers

alike better recognize the program's intersectional nature. It is crucial to conduct studies such as this to help supplement existing knowledge to inform and ultimately impact policy choice, particularly when politicians have not been responsive to the preexisting stratification of students in the halls of higher learning institutions.

An Overview of Merit-Based Financial Aid Programs

Prior to the establishment of publicly funded state merit-based aid programs, student financial assistance was distributed based on monetary need (Heller & Rasmussen, 2001). As such, need-based aid reflected a more egalitarian cultural ethos, found in the United States during the 1960s and 1970s, which held access to postsecondary education should not be reserved only for the wealthy. Opportunity to obtain a higher education was aided at the federal level with the passage of the HEA of 1965 and the Basic Educational Opportunity Grants in the 1972 Amendments (Heller & Rasmussen, 2001; Heller, 2006). However, state-level, need-based aid programs only began in earnest with the establishment of the State Student Incentive Grant program in 1972 (Doyle, 2010; Heller & Rasmussen, 2001).

Before government intervention, merit aid had been long established in the private sector. Yet, it was not until the introduction of Georgia's HOPE scholarship in the early 1990s that the public sector began to transition toward establishing broad-based programs that relieved students of a means test to receive state financial assistance for their postsecondary education (Cornwell & Mustard, 2005; Dynarski, 2004). These modern merit-based programs had little in common with their predecessors, given the sizable amount of financial assistance that students were provided for levels of student achievement that were not particularly robust (Doyle, 2010). Seizing on need-based aid programs' lack of popularity and decrease in purchasing power, savvy politicians sold merit-based aid programs to their constituencies as a way for states to

simultaneously achieve several goals: (a) to create opportunity for economic growth with a more educated/trained populace, (b) endorse greater access to higher education and attainment, (c) keep the best and brightest from attending school out-of-state, and (d) reward and encourage academic achievement (Doyle, 2010; Duffourc, 2006; Heller, 2006).

In many cases, state lotteries are used as an apparatus upon which to build a merit-based aid program. By doing so, politicians essentially create an elective tax. This often appeals to both politicians and their constituencies because monetary resources can be gained without instituting a tax increase, thereby relieving an additional tax burden. During election years, this methodology is particularly popular among governors who advocate spending more on social programs, especially those earmarked for education, while keeping a rise in taxes at bay. Yet, not all programs are created equal. Concern about the fungibility of lottery revenues and the decrease in overall state funding for education continue to plague conversations about merit-based aid development (Stanley & French, 2009).

Political and Economic Foundations of Merit-Based Aid

Given the economic climate, government entities are trying to be fiscally prudent. Thus, it is not uncommon for lawmakers and their constituents to wonder: Does financial aid really matter to student success in college? Simply put—yes. With economic and social advancement increasingly dependent on college degree completion, college attainment and family income in the United States are connected more now than they were in decades past (Goldrick-Rab et al., 2009; Haveman & Smeeding, 2006). Still, paying for a tertiary education can be challenging as tuition and fees continue to rise while many families' incomes have remained stagnant or experienced only a nominal increase. Given this economic trend, there has been concurrent growth in levels of student indebtedness (Pingel & Sponsler, 2015). Interestingly, despite the

clear importance of a college education, there remains "a 40-percentage-point gap in the bachelor's degree completion rates" of high school graduates "from the bottom and top income quartiles" (Goldrick-Rab et al., 2009, p. 1). As a response to this and other economic concerns, states across the country have used merit-based aid programs to promote higher education. Through merit aid, students generally receive a fiscal reprieve of "more than half of tuition and required fees," (Lee, 2018, p. 100) though the exact monetary contribution and eligibility requirements can differ from state to state (Domina, 2014). These programs can also benefit some institutions more than others, as aid recipients are limited to colleges and universities, most often public and sometimes private, located in the granting state's boundaries (Toutkoushian & Paulsen, 2016). Regardless, these contributions are not insignificant, as $11.23 billion in state merit aid funding supported over 4.5 million students across America in 2013 (Pingel & Sponsler, 2015).

Human capital theory. Ultimately, broad-based, state, merit-aid programs are built on the presumption that students are rational actors who will invest in themselves to increase their future earning potential when provided with adequate incentive from the state government as conceptualized by human capital theory (Lee, 2018; Schultz, 1961). Students benefit from this arrangement as aid mitigates the direct costs associated with college, thereby increasing the likelihood of college enrollment, persistence, and completion (Dynarski, 2003; Lee, 2018; Singell, 2004; Sjoquist & Winters, 2015). This positive relationship can be attributed in part to students' abilities to delay entry into the job market and instead invest more of their time cultivating relationships on campuses (Lee, 2018). As Tinto (2010) discussed, the odds of persistence increase through graduation the more a student is integrated and engaged in their institution. Moreover, economists have argued that by expanding budgetary constraints, students

have greater motivation to attend college and persist because the inducement can be taken away if eligibility requirements are not met (Toutkoushian & Paulsen, 2016).

While there is a great deal to encourage the buy-in of students, state-level legislators also need inducement to continue to support broad-based merit aid policy. Support for these policies is bolstered by evidence that investment in local citizens can "increase the quality of life in an area and lead to future population and employment growth" (Sjoquist & Winters, 2015, p. 365). Through educational investment in its own people, states can create nonpecuniary gains, often discussed as *social spillover* (Avery & Hoxby, 2004; Toutkoushian & Shafiq, 2010).

First, states may mitigate interstate competition for their best students by encouraging young people to remain in state through financial incentives (Doyle, 2006; Zhang & Ness, 2010). Secondly, by subsidizing higher education, students, particularly those who are high achieving, develop into "walking capital stocks of considerable income-generating power" (Avery & Hoxby, 2004, p. 240). A capable, educated workforce produces not only increased productivity but economic success as well (Orsuwan & Heck, 2009). In a National Bureau of Economic Research working paper, Bound, Groen, Kezdi, and Turner's (2001) noted, "a modest relationship between degree production. . . and the concentration of college-educated workers in a state's population" (p. 34). From these individuals, larger tax revenues can ultimately be gained and, in turn, be used to fund other programs that propel the public good forward (Toutkoushian & Paulsen, 2016). Other social spillover effects include increased civic engagement, volunteering, and voting among college graduates, in addition to reduced criminal activity and reliance on public welfare (Toutkoushian & Paulsen, 2016; Toutkoushian & Shafiq, 2010).

Access and choice. Other than the achievement of the aforementioned long-term societal goals because of direct educational subsidies to students, goals that are intermediate are often

championed by policymakers, too. Most frequently, such goals include creating equitable access to higher education and increasing student choice (Leslie & Brinkman, 1987). However, these gains are complicated by the fact that money alone is often inadequate to overcome all of the "root causes of disparities in access" (Goldrick-Rab et al., 2009, p. 2). For instance, there is a synergistic relationship between household income and academic preparation that frequently influences persistence. Moreover, low income is associated with a variety of antecedent conditions that make it less likely a student will succeed (Goldrick-Rab et al., 2009). In a model of human capital accumulation, Dynarski (2002) suggested, "low-income individuals will be more sensitive to price if the marginal cost of borrowing rises with the amount borrowed" (p. 283). Research has also indicated such variance is exacerbated by race and gender (Goldrick-Rab et al., 2009). Ultimately, regardless of investment theory, there are sociological and cultural elements that contextualize and influence the complex choices that students must balance related to college (Avery & Hoxby, 2004; Perna, 2006b).

Perna's proposed conceptual model. In examining student financial aid programs and access, Perna (2006a) constructed a unified model of college choice that accounts for the related and often intertwined nature of social, cultural, and economic conditions. Such a model is appropriate for this research endeavor as it contextualizes the decision-making process for college choice that students must go through before completing their academic programs. Ultimately, this process influences college completion because the initial choice of institution directly affects how likely a student is to finish their degree program and graduate. Perna's model draws its usefulness from its ability to engage in discourse not only surrounding college choice but also human capital theory and associated sociological perspectives. The model manages to incorporate not only Schultz (1961) and Becker's (1962) work on human capital

theory but also Hossler and Gallagher's (1987) three-phase model, and Paulsen and St. John's (2002) research on the student choice construct, which includes acknowledgement of "sociological notions of cultural and social capital" (Perna, 2006a, p. 115).

To create a model that accurately reflects the inherent messiness of balancing expectations, individual proclivities, and the rationalization of investment decisions in higher education, Perna (2006a) grounded the model in human capital theory from which expected costs and benefits can be ascertained. What makes the model unique is that a model of human capital theory is embedded in several layers of context. The first layer of context, *habitus*, acknowledges not only demographic characteristics but also cultural and social capital. The following layer of context, *social and community*, recognizes the impact of social structures and resources. A third layer of context, *higher education*, notes the effect of tertiary education institutions as information peddlers and influencers. The layer most removed from the initial human capital model is *social, economic, and policy context*, which send behavioral signals to students and their families (Perna, 2006a). Through its extensive use of context, a far wider understanding of individual-level college choice can be ascertained.

Merit-Based Aid and Access

While some of the aforementioned goals have been selectively met, disparities in levels of access, persistence, and attainment continue to endure and are exacerbated by students' preexisting socioeconomic stratification (Heller, 2006). Serious questions regarding racial equity are frequently raised around the "colorblind" nature of state merit-aid. Through its work with survey data, the National Research Council concluded, "separation and differential treatments of Blacks continue to be widespread in elementary and secondary schools and, in different forms, in institutions of higher learning" (Parker, 1996, p. 767). The inherent disadvantages that most

minorities face in obtaining merit-aid can be attributed to "large gaps in schooling quality and achievement outcomes" (Parker, 1996, pp. 766-767). Even if those barriers are removed for under-represented students, larger cultural perceptions are still hard to overcome. In their work on Tennessee's merit aid program, Ness and Tucker (2008) found that not only were minorities more likely to perceive that their eligibility for merit aid affected their ability to pursue higher education but the same was true for low-income students. Only when students already held high academic aspirations was the perception of eligibility negligible.

By not instituting an income cap, many states have allowed their merit-aid programs to support middle- and upper-income students disproportionately (Cornwell & Mustard, 2005; Dynarski, 2004; Heller, 2006). In doing so, politicians have prioritized "affordability for the middle class" and defunded programs that seek to support genuine financial and educational need (Doyle, 2010, p. 403). Evidence of this has been seen in merit-based awards more than tripling from $2.4 billion during the 1995-1996 academic year to $7.6 billion during the 2003-2004 academic year (Heller, 2006, p. 2). Even more shocking, 90% of aid was need-based in 1984, but by 2005 that figure had dropped by 80% (Doyle, 2010, p. 398). As such, some citizens have come to look at state merit aid scholarships as entities akin to entitlements upon being rolled out to the public (Duffourc, 2006; Heller, 2006).

The Growth of Merit-Based Aid

Political popularity, not smart economic policy, has therefore driven the growth of these programs via policy diffusion (Cohen-Vogel, Ingle, Levine, & Spence, 2008; Duffourc, 2006). Using the Georgia HOPE scholarship as a model, more than one third of states in the United States have implemented some form of merit aid program (Delaney & Ness, 2011). As of 2007, 16 of 22 had instituted a broad-based program (Doyle, 2010). While some states endow their

programs from tobacco settlement funds, land grant endowment funds, or state legislative appropriations, most have followed Georgia's model of being lottery funded. Lottery funding has proven to be controversial, given the inherent instability of the revenue stream and the "regressive nature" of using a lottery to finance scholarships (Duffourc, 2006, p. 240). However, in the case of Georgia, lottery sales have far exceeded initial projections. The overperformance can be credited with the HOPE program's substantial expansion, which ultimately led to the elimination of the income cap and Pell offset (Cornwell & Mustard, 2005). However, not every state has experienced the same kind of robust performance.

Other elements of the Georgia model have been exported outside of the state as well. For instance, qualifications for eligibility in Georgia include graduation from an in-state high school with a 3.0 GPA in core-curriculum courses. Other states with merit-based aid programs have also integrated minimum SAT or ACT scores and class rank into eligibility. To retain their merit aid award, students must maintain a certain GPA, usually a 3.0, and successfully complete a minimum number of credits by the end of the semester or academic year (Cornwell & Mustard, 2005; Duffourc, 2006). If accomplished, programs built in Georgia's image for undergraduates attending 4-year institutions would provide enough aid to cover tuition, fees, and a limited book allowance. However, should a student choose to pursue a program at a 2-year institution, only tuition and fees are subsidized (Cornwell & Mustard, 2005).

Context and History of South Carolina's Merit-Based Aid Program

A centerpiece of former Governor Jim Hodges's 1998 campaign, the South Carolina Education Lottery and merit-based scholarship program were an attempt to bring much of Georgia's model to South Carolina (Cope, 2014). Following Georgia's lottery-funding framework, it was the hope of Hodges and South Carolina Democrats that creating a voluntary

tax funneled into education would yield significant social spillover while simultaneously locking the White, suburban vote.

In 2000, the proposed merit-based aid program received wide support across the state. Voters passed an amendment to the state constitution to allow a state-run lottery in response (Daprile, 2018b). South Carolina formally established the South Carolina Education Lottery in 2001 and sold the first tickets in January of 2002 (Adcox, 2014; SC Act No. 59, §2, 2001). The three-tiered scholarship program became operational during the 2002-2003 academic year and encapsulates the Palmetto Fellows scholarship, the LIFE scholarship, and the HOPE scholarship (SCCHE, 2019a, 2019b). All three awards were meant to encourage students to attend in-state schools, keep high achieving students in South Carolina, and ultimately generate increased tax revenue, as college-educated residents earned more income (Cope, 2014). Since its institution, the lottery has raised over $5 billion dollars with most of that being allocated to the merit-aid program (Daprile, 2018b). However, unlike Georgia, even substantial lottery revenue cannot cover the cost of all merit aid scholarships, leaving taxpayers to pick up the difference. With totals already nearing $80 million a year, legislators are increasingly concerned about the impact of the new 10-point grading scale as it could make up to an additional 25,500 students eligible for assistance inflating the cost closer to over $88 million (Daprile, 2018a). This contrast is even starker when comparing the figure to that in 2004—$29 million (Cope, 2014). Given other interests competing for state funding, the legislature has regularly considered increasing the required GPA and SAT/ACT score for eligibility and decreasing award amounts (Daprile, 2018a).

The Palmetto Fellows Scholarship. The Palmetto Fellows Scholarship, intended for South Carolina's most academically gifted, was originally established in 1988 by the state

legislature to “foster scholarship among the state’s postsecondary students and retain South Carolina high school graduates in the state through awards based on scholarship and achievement” (SC Act No. 739, §1, 1998). Upon the creation of the state lottery, the scholarship was folded into the larger merit-based aid program and no longer derived its funding merely from allocations made solely by the South Carolina General Assembly. The scholarship is a last-dollar award that varies depending on other public funding for which the student is eligible (M. Hare, personal communication, August 26, 2019). Palmetto Fellows may receive up to $6,700 their freshman year and $7,500 their sophomore through senior years. This does not include the scholarship enhancement created in 2007 available to those in majoring in math, science, and health fields at 4-year institutions. With the enhancement, the award increases to a maximum of $10,000 annually (SCCHE, 2019b). However, “the scholarships in combination with all other grants and scholarships [cannot] exceed the cost of attendance at the institution attended” (SC Act No. 739, §1, 1998). Few students typically receive the scholarship, with only 8,900 obtaining it during the 2018-2019 academic year (SCCHE, 2019c).

To be eligible for the Palmetto Fellows award, a student must complete an application and meet some general requirements: (a) be a U.S. citizen, (b) be a South Carolina resident at the time of high school graduation, (c) graduate from a high school in the state of South Carolina, (d) have no felony convictions, (e) have no second alcohol/drug-related misdemeanors, and (f) be in good standing in relation to all state and federal loans. Academic requirements include (a) ranking in the top 6% of one’s class at the end of 10th, 11th, or 12th grade; (b) earning a 1200 on the SAT or 27 on the ACT by June of the student’s graduating year; (c) and earning a 3.5 cumulative GPA based on the South Carolina Uniform Grading Policy. Alternatively, a student can earn the scholarship without regard to rank if they score a 1400 on the SAT or 32 on the

ACT and earn a 4.0 cumulative GPA (SCCHE , 2019b). To keep the scholarship, a student must earn a 3.0 cumulative GPA and complete 30 credit hours by the end of the academic year (University of South Carolina [USC], n.d.b).

The LIFE scholarship. The LIFE scholarship was created in 1998 to "increase access to higher education, improve employability of South Carolina's students, provide incentives for students to be better prepared for college, and encourage students to graduate from college on time" (SC Act No. 739, §1, 1998; SCCHE, 2019a). Much like the Palmetto Fellows scholarship, this scholarship was enveloped by the larger merit-aid program with the institution of the South Carolina Education Lottery. To date, most South Carolina students obtain the LIFE scholarship. 43,829 obtained the scholarship in 2018-2019 alone (SCCHE, 2019c). Unlike the Palmetto Fellows scholarship, the LIFE is a first-dollar award and therefore does not take into account any additional public funding the student is eligible for (M. Hare, personal communication, August 26, 2019). This award includes up to $5,000 each academic year at a 4-year institution or the cost of tuition, including a $300 book allowance, at 2-year institutions. Since 2007, the LIFE enhancement has also been available to students majoring in math, science, and health fields at 4-year institutions. This enhancement increases the award from $5,000 to $7,500.

To be eligible for the LIFE scholarship, a student must be a South Carolina resident at the time of high school graduation. If attending a 4-year institution, a student has to meet two of the three requirements: (a) graduate high school with a 3.0 cumulative GPA, (b) rank in the top 30% of their graduating class, and (c) make an 1100 on the SAT/24 on the ACT by June of their graduating year. If a student plans to enroll at a 2-year school, they must only graduate with a 3.0 cumulative GPA and not be receiving any other state tuition assistance. To retain the scholarship,

a student must maintain a 3.0 cumulative GPA and successfully complete 30 credit hours by the end of the academic year (USC, n.d.a).

The HOPE scholarship. The HOPE scholarship was established in 2001 and rolled out in 2002-2003 in tandem with the South Carolina Education Lottery. The scholarship was created for first-time freshmen attending 4-year schools who did not meet the thresholds for the LIFE scholarship or the Palmetto Fellows. As of 2018-2019, only 4,156 students have obtained the HOPE (SCCHE, 2019c). The scholarship is only available for a student's first year and acts as gateway to the LIFE scholarship, should all eligibility criteria be met. The award is also first-dollar spent (M. Hare, personal communication, August 26, 2019). Much like the LIFE scholarship at 2-year institutions, the only requirements for HOPE are being a South Carolina resident at high school graduation and enrollment, making at least a 3.0 cumulative GPA in high school, and not being a recipient of any other state tuition assistance. To be eligible to receive the LIFE scholarship after completing freshman year, a student must earn a 3.0 cumulative GPA at their university and complete 30 credit hours by the end of the academic year (SCCHE, 2019a).

Programmatic issues. Unsurprisingly, vast inequities can be found across the board when examining the amount of benefit derived from South Carolina merit-based scholarships. Overwhelmingly, students from historically underrepresented groups do not receive the same level of merit-based assistance as their White, economically advantaged counterparts. When examining poor, rural communities that are frequently communities of color, some disturbing trends emerge. For instance, in Orangeburg County, where the poverty rate is among the highest in the state, the average person has spent $1,274 on the lottery since 2008. Yet, for each dollar a resident has spent, they have only received 41 cents in educational benefits, including scholarships and K-12 funding. In Pickens County, where the poverty rate is among the lowest in

the state, the average resident has spent $141 on the lottery since 2008. However, Pickens County citizens received $3.26 in educational benefit. Simply put, the poorer the county, the less lottery money they see (Daprile, 2018b).

Because the state of South Carolina awards scholarships without regard for financial need, it is easy to see the disparity that has ballooned. Of the 20 poorest school districts in South Carolina, only 27% of students were eligible for the Palmetto Fellows and LIFE scholarships, compared to 47% of students who were eligible in the 20 richest school districts. Furthermore, 32% of all scholarship funds went to 17% of students attending either the USC or Clemson University. Beyond economic inequity is also evidence of racial inequality as only 3% of Palmetto Fellows recipients were African American. This is a noticeable contrast to the 42% of African American recipients receiving the HOPE scholarship (Daprile, 2018b).

Effects on Outcomes

Award of Aid and Enrollment

If a layperson listened to public discourse surrounding the establishment of merit-based scholarships, they would be led to believe that one of the primary objectives of broad-based state merit aid is to level the playing field. The predominant narrative is that all students have an equal opportunity to obtain financial assistance, and that monetary incentive should encourage increased levels of academic motivation among students to reach their fullest potential. While such a narrative provides a neat soundbite, populations historically underrepresented in higher education remain the least likely to receive merit aid (Heller & Rasmussen, 2001). As Heller and Rasmussen (2001) pointed out, there is a significant correlation “between income levels in communities in which students attend school, as measured by the proportion of students who qualify for free lunch, and the probability that a student would earn a scholarship” (p. 17).

Dynarski (2004) echoed this finding in the observation that "Blacks, Hispanics, and low-income youths are relatively unlikely to attend college, so any subsidy to college students will flow disproportionately to White, upper-income youth" (p. 68). This does little to close participation gaps among students from divergent socioeconomic and racial backgrounds. Florida, Michigan, and Massachusetts all skewed their awards toward wealthier students in the racial majority (Heller, 2006). There is evidence that Georgia's HOPE scholarship worsened the stratification of enrollment at in-state institutions (Cornwell & Mustard, 2005). Furthermore, student recipients of merit-based aid are those most likely to have pursued a college education regardless of additional funding (Doyle, 2010). Georgia provides an example of this phenomenon, as over 90% of HOPE funds were allocated to students who would have attended a college or university without the additional financial assistance (Heller, 2006).

There are a number of reasons why the differences between race and socioeconomic status are so stark in relation to enrollment. First, "race and socioeconomic status are highly correlated, both in and among schools" (Heller & Rasmussen, 2001, p. 10). Moreover, during years with less revenue, legislatures are known to tweak awards' eligibility requirements to curb the number of recipients. As a result, students in the lowest income brackets are hit the hardest. Exacerbating eligibility limitations is inconsistency across secondary schools' grading scales causing both grade inflation and uneven achievement levels (Duffourc, 2006). Poor standardized test performance also disadvantages minority students due to the well-documented correlation between standardized assessment and race, which is ultimately linked back to socioeconomic status (Dynarski, 2004). However, there is limited evidence that rises in SAT scores among Georgia's students are indirectly related to the incentivized nature of merit aid, supporting

achievement motivation theory (Cornwell & Mustard, 2002; Goetz, Mimura, Desai, & Cude, 2008).

Regardless of aid amount, different types of awards have varying impacts on attendance. For example, students are more likely to enroll when awarded a grant than a loan or work-study funding (Heller & Rasmussen, 2001). Larger fiscal trends can affect enrollment too, as seen in the inverse relationship between the reduction of low-income student attendance upon the increase in merit-aid spending (Heller, 2006). As such, Black, Hispanic, and low-income students are more responsive to changes to price and financial aid than are their counterparts (Heller & Rasmussen, 2001).

Awards and enrollment are also influenced by institution type. Looking across programs, Doyle (2010) found enrollment is positively affected more at 4-year colleges and universities than it is at 2-year institutions. In the context of Georgia's HOPE program, nearly an 8% rise in enrollment occurred in 4-year colleges and universities, whereas rates at 2-year institutions remained stagnant. It should be noted "two-thirds of the 8 percent (scholarship-induced) rise in total enrollments can be attributed to students' decisions to remain in state" (Cornwell & Mustard, 2001, p. 2). Despite this increase, greater institutional diversification has not occurred as minority students made gains largely at the state's less selective institutions (Cornwell & Mustard, 2002).

Ultimately, part of merit-based aid programs' mandates is also to help stymie outmigration to other states. By providing inducements to a state's best and brightest, the brain-drain phenomenon is meant to be curbed. It is done via enrollment at an in-state higher education institution, which hopefully yields dividends postgraduation. While causation across multiple state programs has not been established en masse, two studies have been conducted on the

interaction between merit-based aid and brain drain. Cornwell, Mustard, and Sridhar (2006) examined the impact of Georgia's HOPE scholarship and found the program reduced the number of students leaving to attend college out of state by about two thirds of the sample size. In their examination of the brain drain hypothesis, Zhang and Ness (2010) later found on average, state merit aid scholarships increased first-year enrollment and resident college enrollment across a 14-state sample. However, Zhang and Ness's (2010) results saw variation, particularly in Kentucky, Michigan, New Mexico, and West Virginia, based on type of institution, award criteria, and award amount.

Retention and Completion

While broad-based merit aid programs have made some gains, such as Georgia's increased enrollment for first-time freshmen, it is all for naught if eligible students who are awarded aid cannot keep the subsidy throughout the duration of their postsecondary careers or complete their degree programs (Cornwell & Mustard, 2001). Such concern is not without merit as state scholarship programs are often disparaged for being easy to obtain but difficult to retain (Duffourc, 2006). Programs in New Mexico and Tennessee have found "many students who do not retain these scholarships do not persist in higher education" (Doyle, 2010, p. 401). Social and economic impediments further compound the likelihood students who would be unable to attend an institution of higher learning without merit aid drop out after the first year.

Retention criteria typically include maintaining a minimum GPA and satisfactorily completing a set number of credit hours in a given time frame, thresholds meant to maintain the integrity of the merit aid programs (Duffourc, 2006). Meeting those requirements can prove difficult, and students may behave in ways antithetical to the spirit of the scholarships to meet their benchmarks and maintain their aid for the next academic year. Cornwell and Mustard

(2005) examined this phenomenon at length in Georgia and found the HOPE scholarship shaped the behaviors of students at or below the scholarship's GPA threshold in the following ways:

- decreased full-load enrollment and increased course withdrawals,
- influence on course-taking behavior during the academic year,
- diversion of course-taking to summer school when grades are typically higher, and
- influence on the declaration of majors (Cornwell & Mustard, 2005, p. 36).

These trends are not merely part of the merit aid conversation. Despite the rise in college attendance since the 1960s, approximately half of college students still dropout before completing their degree. This sets the stage for slow future growth in the educated labor market. A number of hypotheses exist as to why growth rates may be so low in comparison to other developed nations, such as Japan and Korea (Dynarski, 2005). These hypotheses include weak connections with their campus communities, poor academic preparation in high school, and college costs. Dynarski (2005) found significant evidence that subsidies to college's direct costs yield higher levels of persistence and completion. As such, merit-aid policy can play an integral role in the construction of a state's educated workforce. However, a reduction to direct costs alone is not always enough to keep students engaged in tertiary academic endeavors.

Merit-Aid Issues Yet to Address

Given that states have broadly instituted merit-based aid only recently, there are still larger issues that scholars have yet to address adequately. One of the most obvious is a lack of standard typology from which to operationalize and replicate research. Delaney and Ness (2011) addressed this in their work, noting operationalization is stymied because "the current literature on state-level merit aid programs does not agree on the number of merit aid programs, which states have merit aid programs, or even the years that the programs started" (p. 3). The lack of

agreement hinders the ability to replicate research with the objective of developing theories that are more generalizable. While Delaney and Ness (2011) suggested possible typologies based on program characteristics, magnitude, and rigor, the fundamental issue of disagreement over meaning and scope would likely remain.

Research is also limited in the examination of the distributional effects of state merit aid, thereby affecting further analysis of causal relationships among underrepresented students and impact on completion. Marin (2002) noted the ambiguity of what qualifies as merit, in addition to the structure of the programs, lend themselves to increasing inequality of access to both minority and low-income students. Moreover, Marin (2002) pointed out increasing disparities in education eventually transition into disproportionately large income gaps in already underrepresented populations. Evidence of these trends are strengthened by Heller and Rasmussen's (2002) study of merit aid in Florida and Michigan where they determined that not only was there a "strong relationship between socioeconomic characteristics and the rate at which students qualify for the merit scholarships in these states," but students receiving merit aid were graduating from high schools that already had high rates of college enrollment (Marin, 2002, p. 113).

One must only look at the dynamic between need-based aid and merit-based aid to have a sense of just how skewed distributional effects can be. For instance:

> Between 1982 and 2000 spending on need-based scholarships for undergraduates by states increased 7.4% annually, while spending on merit programs increased at a 13.6% annual rate. The proportion of state grants awarded based on merit has risen from 9% to 22% during this period. (Heller & Rasmussen, 2001, p. 1)

It is due to such inequity in dispersion that detractors say funding allocated to merit aid would be used more effectively and efficiently if it were awarded based on need. Ultimately, there is no way to know how states would spend money given different circumstances. Therefore, one cannot be certain that money would be better spent on need-based aid (Doyle, 2010).

CHAPTER 3

DATA AND METHODS

This inquiry intended to investigate the influence of South Carolina's three merit-based financial aid awards on academic program completion at both the state and institution-level. Employing a statewide representative sample of first-year cohorts from the South Carolina CHEMIS dataset, I endeavored to develop our empirical understanding of how South Carolina's merit-based aid awards influence 2- and 4-year academic program completion, thereby identifying broad trends across the state.

I examined the significant interplay between human capital and socioeconomic contexts on completion using multinomial logistic regression analyses. The state-level analysis was restricted to full-time, in-state, degree-seeking students as all South Carolina state scholarships require those qualifications. A dataset of the 2012-2013 freshman cohort at a mid-sized, public postsecondary institution in South Carolina was used to determine if state-level trends can be observed at the institution level or if institutions have their own distinct "flavor," operating independently from the mass. The relationship between human, social, and economic capital was examined. Using logistic regression analysis, I analyzed the relational impact of predictors such as demographic controls, institution type, high school achievement, and economic indicators. Results indicated there are various factors consistent among certain recipients and subpopulations that could be used to inform future policy discussions surrounding South Carolina merit-based aid reform efforts and increase the likelihood of student completion.

The theoretical framework of this study indicates that students invest their capital in higher education because the initial costs incurred will be outweighed by the promise of increased future earnings. Yet, the type of institution in which a student invests their time and money is driven by a combination of far-reaching social and economic factors. As such, this study was formed around the hypothesis that positive effects of South Carolina's merit-based aid are not universally felt by all recipients per the effects of economic, human, and social capital. To test this hypothesis, I asked the following research questions:

- Research Question 1: Is there a positive or negative relationship between South Carolina's merit-based aid and academic program completion of students?
- Research Question 2**:** What other factors are likely to impact student graduation rates in South Carolina?

The following sections of this chapter detail the methodology used in examining the relationship between the merit-based aid programs and completion. I start with an overview of the data and then detail the construction of the dependent and independent variables for both the state-level models and the institution-level model. Following this, I then describe the logistic regression models used in the study. I conclude by noting the data's inherent limitations and my own intrinsic biases as a researcher.

Data

Data Description

This study is comprised of two samples of students who did or did not receive one of the three South Carolina merit-based aid scholarships: Palmetto Fellows, LIFE, and HOPE. The first sample captures macro-level trends across the state. The second sample examined only a singular institution with the aim of capturing patterns evident at the micro level. It is this study's

objective to see if statewide trends are mirrored at the institution level or if there is significant deviation.

State-level sample. Data for the state-level sample was obtained via request from the SCCHE for use of the CHEMIS dataset. The CHEMIS dataset is intended to comprehensively evaluate, in a longitudinal manner, varied factors that influence student learning and development during postsecondary education. As such, the sample included de-identified first-year cohort data for undergraduates who received or did not receive state merit-based aid in the years of 2002-2012, though academic program completion/graduation is reported through Spring 2018. Commission on Higher Education Management Information System (CHEMIS) data are self-reported throughout the year by each 2- and 4-year institution in South Carolina, following submission deadlines set by SCCHE (2018b). I selected the CHEMIS dataset for this project due to its wide institutional selectivity and general scope. Furthermore, it not only includes variables associated with state merit-based aid and academic outcomes but also variables that would support student demographics (SCCHE, 2018a).

The 2002-2012 sample contains 320,015 individual observations.[4] However, the sampling design did not ensure that the observations were truly reflective of the state of South Carolina. As such, Table 1 places the CHEMIS sample data into context. Based on CHEMIS data and the U.S. Census's 2012 American Community Survey (ACS), the table compares values for South Carolina's population, sex, race, and educational attainment.[5]

While the CHEMIS sample is not found to be universally representative in comparison to the state-level data provided by U.S. Census, it does provide an adequate generalized picture of the state. For instance, the state's gender divide is noted as males comprising 42.68% of the

[4] The year 2012 was chosen as the end threshold to ensure adequate time to report 6-year graduation rates.
[5] Data for 2012 was reported as it is the most recent cohort year.

CHEMIS sample. This is 5.92% less than the statewide Census data. Concerning race, Whites are underrepresented in the CHEMIS dataset by 3.92%, while African Americans are overrepresented at a rate of 2.42%. Hispanics are also underrepresented at a rate of 3.28%.

Table 1

Comparison of SC Demographics: CHEMIS Dataset vs. US Census

	SC CHEMIS Dataset	South Carolina
Population (estimates)	320,015	4,723,723
Male	42.68%	48.60%
Race		
White, not Hispanic or Latino	63.08%	67.00%
Black/African American	30.12%	27.70%
Hispanic or Latino Origin (of any race)	2.02%	5.30%
American Indian and Alaska Native	0.43%	0.30%
Asian	1.39%	1.30%
Native Hawaiian and Other Pacific Islander	-	0.00%
Some Other Race	2.93%	1.70%
Two or More Races	-	2.00%
Educational Attainment		
High school graduate or higher	100%	84.90%
Bachelor's degree or higher	39.25%	25.10%

However, all other reported minorities fell 0.09 to 1.23 percentage points of the reported census data. Lastly, bachelor's degree attainment is overrepresented in the CHEMIS dataset by over 14%.

Institution-level sample. Single-institution sample data were obtained from the institutional research office of a medium-sized, public university in South Carolina. This sample includes de-identified, student-level data for 1,051 students in a 2012-2013 freshman cohort. All of the data were obtained through official university records and the National Student Clearinghouse. The dataset was chosen for this project to shine a light on undercurrents at the institution level about the effect of state merit-based aid on academic program completion.

Furthermore, additional data, such as expected family contribution (EFC) and on-campus housing, was provided at the institution level compared to the state level. This allowed a more nuanced picture to be developed and better informed by human capital theory and Perna's (2006a) proposed conceptual model.

Operationalization

Dependent Variables

State level. The dependent variable for the study's respective models was a categorical completion variable with three classifications: n*o academic program completion*, *4-year completion*, and *2-year completion*. Approximately 39.25% of the total sample of 320,015 completed an academic program at a 4-year institution and 20.21% completed an academic program at a 2-year institution, leaving 40.54% who did not complete a degree program at any postsecondary institution between Fall 2002 and Spring 2018.[6]

Institution level. The dependent variable for this study captures academic program completion/graduation at a mid-sized, state institution between Fall 2012 and Spring 2018. Approximately 56% completed their programs at the same institution. Completion was not reported in this study if the student finished an academic program elsewhere.

Independent Variables

Demographic variables.

***Gender*.** As a primary demographic variable, gender was included in both the state-level and institution-level models as a dummy variable (0 = *female*, 1 = *male*). Gender was an

[6] Though only 2002-2012 cohorts are used in this study, student's respective graduation dates are reported as far as Spring 2018. Completion rates are based on completion of first-degree program. Two-year or 4-year completion was determined as follows: A certificate, diploma, or associate degree was classified as a 2-year program, while a bachelor's degree was classified as a 4-year program. The 4-year or 2-year institution associated with the student is that which the student was first enrolled. Such institutional categorization was used to create variables on institutional typology. The names and types of institutions that students transferred to were not made available. However, over a quarter of all students transferred institutions over the course of their academic career.

important addition to the model as historically, males have had higher college completion rates. It is only in the past few decades that female-favorable rates, particularly for White women, have become the norm, coinciding with increased returns from their participation in higher education (Buchmann & DiPrete, 2006; DiPrete & Buchmann, 2006; Goldin, Katz, & Kuziemko, 2006). Those returns are tied to gains in standard of living, growing incentives to enter the work force, delayed age of marriage, and superior academic performance. Meanwhile, the decrease in male completion rates has been attributed to developmental differences between men and women and a correlation between absent or low-educated fathers (Buchmann & DiPrete, 2006). Including gender in the multinomial models was important, as completion rates for 4-year programs tend to be regularly calculated, but rates for 2-year programs are not. Moreover, variance in tuition and aid sensitivity can also be compounded by gender (Goldrick-Rab et al., 2009).

***Race*.** Race was included in all models as dummy variables because certain racial minorities are more likely to attend particular institutions rather than others due to tuition and aid sensitivity. Scholarship from Goldrick-Rab et al. (2009) and Heller and Rasmussen (2001) supports this claim. Such sensitivity can influence not only college choice but also a student's likelihood of completing their academic program. Furthermore, most minority students encounter challenges obtaining merit aid due to the disparities in schooling quality (Parker, 1996).

Merit variable.

***Scholarship*.** Three dummy variables, one for each of the state's merit-based aid awards, were included as the main explanatory variables. Being able to identify which scholarships, if any, had a positive or negative effect was particularly important when looking at the breakdown between 2- and 4-year institutions.

Socioeconomic variables.

Location/Development. Titus (2006) found socioeconomic status had an impact on college completion rates. As such, dummy variables for the I-95 Corridor and economic development regions were included to capture regional development and broad socioeconomic trends. These variables were originally added to the state-level model as a loose proxy for both location and socioeconomics, as the Commission of Higher Education would not release any data related to student socioeconomic status or economic proxies related to their high school. Another measure, such as average household income, was not used as a proxy because the time period examined includes the economic downturn, recession, and recovery of the late 2000s to early 2010s. During that period, incomes on record could be quite volatile from year to year. Instead, regional indicators were used to track broad development trends that were typically more consistent.

Given the location element of the breakdown, these variables were also included in the institution-level model. Location is also important factor in college choice as Mattern and Wyatt (2009) found the median distance students will go away to college is 94 miles.

The I-95 Corridor was included alongside the state's economic development regions as it is a diverse region constituting 17 counties. Over a million people live along the heavily used transportation route. However, historically, "problems ranging from struggling schools to cyclical poverty to lagging health and social well-being indicators" have plagued the area (Moore & Lawrence, 2009, p. 1). Furthermore, a great deal of national attention was brought to the corridor's neglected K-12 school systems with the documentary *Corridor of Shame* (Ferillo, 2006).

Expected family contribution and Pell grants. For the institution-level model, I obtained data for EFC and whether or not a student received a Pell grant. Expected family contribution and Pell grants were included as income inequality has long been a significant issue, contributing to incongruity in college completion rates. Despite knowing that college completion can aid in upward social mobility, lower family income still contributes to limited odds for college completion. For instance, "11% of Pell Grant recipients [who] enter public universities do not enroll for a second year of college, and about 80% do not received a bachelor's degree in 4 years" (Goldrick-Rab, Kelchen, Harris, & Benson, 2016, p. 1764). This is not surprising as low-income students are more sensitive to price (Dynarski, 2002). Moreover, there is a correlation between low-income students and their likelihood to obtain a merit-based subsidy to go to college (Dynarski, 2004; Heller & Rasmussen, 2001).

Institution type.

2-year. Four-year and 2-year institutions are wildly different in both mission and the populations that they serve. While the private returns of attending a 4-year college are usually greater than the private returns of attending a 2-year college, there are many students whose college choice is dictated by direct costs and personal circumstance. For instance, both minority and low-income students are more likely to attend 2-year schools due to price sensitivity (Heller & Rasmussen, 2001). By looking at the nary studied 2-year sector, I sought to confirm Doyle's (2010) finding that enrollment is positively impacted at 4-year institutions more than 2-year institutions. Moreover, as over 40% of South Carolina's students are enrolled at 2-year institutions, it is important to track developments in this field, particularly as many of these students can be overlooked in favor of their 4-year counterparts.

High school ability.

High school rank. Available for both state-level and institution-level models, high school rank bands were used to determine the relative position of a student's precollege ability. This was then used as a proxy to determine the likelihood of success in college. Per the work of Light and Strayer (2000), academic ability not only has a positive effect on college attendance but also on completion, as there is a significant correlation between ability and college quality.

ACT score. Like high school rank and SAT scores, ACT scores were used as a comparable benchmark for abilities and were provided for the institution-level model.[7] Student ability is known to be correlated with institutional selectivity (Hearn, 1984). For instance, Hearn (1984) noted high-ability students had an increased likelihood of attending selective institutions. Meanwhile, Ganderton (1992) used average SAT scores as a measure of quality when determining if institutional quality is an important factor in the college choice process between private and public schools. It is also important to examine standardized test scores, as there is a well-documented history of a negative relationship between such assessments and race, which is tied back to socioeconomic trends (Dynarski, 2004).

Empirical Model

For this investigation, assessing the relationship between South Carolina's merit-based aid and academic program completion, I conducted post hoc data analysis by running multinomial logistic regression (mlogit) models given the categorical nature of the dependent variable (0 = *did not complete academic program/graduate*, 1 = *completed 2-year academic*

[7] Students in the dataset had either their SAT score, ACT score, or both reported. SAT scores were converted into ACT scores using the 2018 ACT/SAT concordance table (ACT, 2018). This was chosen rather than the reverse as the ACT bands were more forgiving that trying to fit ACT scores into SAT bands. It should also be noted that SAT scores were not composites. Instead, only verbal and math scores for the year 2012 were reported. During this time, there was a required writing portion. To ensure that almost half of the observations were not lost, the verbal and math scores alone were treated as the composite score.

program/graduated, and 2 = *completed a 4-year academic program/graduated*). All results are reported as marginal effects, which represent the probability of change in the dependent variable given changes to an independent variable. Used in econometrics since at least the 1950s, maximum likelihood (ML) estimation "systematically searches over different possible population values, finally selecting parameter estimates that are most likely (have the ML) to be true given sample observations" (Eliason, 1993, p. v). In using logits, I was able to simultaneously examine multiple influences on the dependent variable (Berry & Feldman, 1985). Furthermore, logistic regression models yield unbiased, consistent, and efficient estimators under normal circumstances. Such analyses are common in the merit-based aid literature and the methodology is considered legitimate and appropriate for the research in question (Baksh & Hoyt, 2001; Groen, 2004; Monks, 2009).

In using ML estimation for academic program completion, two types of logistic regression models were run: a pooled multinomial logit by year and logits run separately by each cohort year. The pooled logit provided the opportunity to examine the interplay of completion and other indicators, including receipt of scholarship, but does so across years. Meanwhile, the alternative approach, logits run by year, examined such probabilities on an annual basis.
The multinomial regression model for completion at the state level can be noted as the following equation:

$$\Pr(y_i = m|x_i) = \frac{\exp(x_i\beta_m)}{\Sigma_{j=1}^{J}\exp\,(x_i\beta_j)}$$

Pr $(y_i = m|x_i)$ represents the probability of observing academic program completion of the i^{th} individual conditioned upon multiple independent variables (e.g., x_i). At the state level, those variables include scholarship type, institution type, gender, high school ability, race, and location/development. In the pooled model, dummy variables for each year were also included.

The probability is a function of $x\beta_m$, from which the exponential is used to ensure that the probabilities are nonnegative: $\exp(x_i\beta_m)$. $\Sigma_{j=1}^{J}\exp\,(x_i\beta_j)$ is then used to divide $\exp(x_i\beta_m)$, to make the probabilities sum to 1. Throughout this, *J* is the number outcomes. In this case, there are three possible outcomes. These three outcomes are expressed as:

$$\Pr(y_i = 1|x_i) = \frac{\exp(x_i\beta_m)}{\Sigma_{j=3}^{J}\exp\,(x_i\beta_j)}$$

$$\Pr(y_i = 2|x_i) = \frac{\exp(x_i\beta_m)}{\Sigma_{j=3}^{J}\exp\,(x_i\beta_j)}$$

$$\Pr(y_i = 3|x_i) = \frac{\exp(x_i\beta_m)}{\Sigma_{j=1}^{J}\exp\,(x_i\beta_j)}$$

For those multinomial logits looking by year: $\Pr(y_i = m|x_i) = \frac{\exp(x_i\beta_m)}{\Sigma_{j=1}^{J}\exp\,(x_i\beta_j)}$ if year = *z*. *z* could be any year from 2002 to 2012 (Long, 1997).

The logistic regression model for completion used for the institution-level model can be formally summarized in the following equation: $Y_i^* = b_k X_{ik} + u_i$. Y_i^* represents the latent preference for academic program completion of the i^{th} individual conditioned upon the multiple independent variables (e.g., X_{ik}). The measure b_k demonstrates the effect of change in X_{ik} on the variable of Y_i^*. The measure u_i is the mean-zero error term that captures all other influences, both random and unobserved (Aldrich & Nelson, 1984; Box-Steffensmeier, Brady, & Collier, 2008; Dee & Jackson, 1999; Gujarati, 2003). Completion is defined by the binary indicator Y_i^*:

$$Y_i = 1 \text{ if } Y_i^* > 0$$

$$Y_i = 0 \text{ if } Y_i^* \leq 0.$$

Limitations and Potential Bias

As with any quantitative research endeavor, the reality of navigating limitations is significant. In this case, the first limitation was the temporal element. To ensure students had the opportunity to complete their degrees in at least 6 years, I limited the dataset to first-year cohorts from 2002 to 2012. Even though the SCCHE had provided cohort data through 2018, several years could not be included for this reason. Likewise, only the 2012-2013 freshman cohort from a mid-sized, public university was reported for the institution-level model. This was done to ensure the possibility of graduation in 6 years. However, the explanatory power gained from analyzing only one cohort was limited. If I were to do this again, I would attempt to obtain data from the university for additional freshman cohorts that predate 2012.

The biggest limitations were the result of the South Carolina Commission of Higher Education being reluctant to provide any information about student socioeconomic status (e.g., Pell grant recipients) or even basic information on a student's high school, from which some economic indicators might be gained. Even high school ability was limited to merely bands of high school class rank. Grade point average and SAT/ACT score requests were rejected, thus curbing any additional explanatory power about K-12 preparedness and overall academic quality.

An additional challenge proved to be that only the initial institution at which a student enrolled was noted. If a student transferred, only a dichotomous indicator was available. Thus, I had no way of identifying which institutions students transferred to, nor did they identify what type of institution that the individual moved to (e.g., 2- or 4-year, research or comprehensive teaching, public or private).

Just as I encountered constraints related to data, I also must acknowledge the subconscious limitations that I may inadvertently be placing on my understanding of the topic at

hand. As a student-facing administrator, I deal with the reality of trying to help students navigate merit-based aid programs on a daily basis. Furthermore, a significant part of my job entails assisting students in gaining the academic support needed to keep their scholarships. I am admittedly sensitized to the number of individuals who lose their aid and do not have the ability to return to school without it through no lack of hard work. That being said, the guidelines for scholarship retention are clear and it is up to the individual student to commit themselves to retaining those funds.

CHAPTER FOUR

RESULTS

In examining the association between South Carolina's merit-based financial aid and academic program completion, I found there to be a statistically significant and positive relationship. However, the extent to which that aid correlates to the completion rates of 4-year programs versus 2-year programs is considerable, as not all yield the same kind of support. Furthermore, external factors, such as race and socioeconomic conditions, continue to mitigate program completion as well. I found strong evidence that South Carolina's merit-based financial aid benefits students who graduate from 4-year programs far more than students who graduate from 2-year programs. Given the size of South Carolina's 2- and 4-year populations, neither should be readily dismissed. Four-year program completion trends are supported by not only several multinomial models at the state level but also an institution-level logistic regression used to evaluate a freshman cohort from a public institution in the state.

The discussion that follows is an examination of both state-level and institution-level results. In each section, I discuss descriptive analyses and general trends, results of the related regression models, and the checks used to ensure accurate findings.

State-Level Results

As detailed in Chapter 3, I undertook several year-specific multinomial logistic regressions. Each of these multinomial logits explores the dependent variable of program completion/graduation. The variable of completion examines a population that did not complete their 2- or 4-year degree program, a population that completed their 2-year academic program,

and a population that completed their 4-year academic program. The primary independent variables attempting to explain the effect of state merit-based aid were dummy variables for scholarship received: *Palmetto Fellows*, *LIFE*, and *HOPE*. To explain the impact of other social, cultural, and economic factors, variables ranging from gender to race to state economic development region were also included. While not comprehensive enough to provide evidence of causation, an overall picture of college completion in South Carolina and its relationship to merit-based aid emerged. Thus, this allows for a more comprehensive look at the state's merit-based aid programs and any correlated factors.

Descriptive Analysis

Per the descriptive statistics in Table 2, some general trends were identified from the sample of 320,015. First, based on their respective means, most students who received merit-based aid between 2002-2012 received the LIFE scholarship with an average of 41.9%. The HOPE scholarship followed next at 8.7%, with the most selective scholarship, the Palmetto Fellows, trailing at 5.2%. The remainder of students were not merit-aid award recipients.

Of the sample, 47.8% of students initially enrolled in a 2-year institution. Out of all of students enrolled in 2- and 4-year institutions, 43.1% enrolled at technical colleges, while 17.0% enrolled at independent 2-year institutions. Few students (3%) enrolled at a 2-year USC campus. Of the students who went to 4-year schools, most attended comprehensive teaching institutions (22.5%). Interestingly, the average number of students who attended a research institution or an independent senior institution was nearly identical: 14.8% went to a research institution, while 14.9% attended an independent senior institution.

While the majority of the sample was female, a sizable portion was male (42.7%). In terms of other student characteristics, most students in the sample, 63.1% were White. The next

Table 2

Summary Statistics for the 2002-2012 Cohorts at 2- and 4-Year Institutions in SC

	Academic Program Completion (n = 320,015)			
	Mean	Std. Dev.	Min	Max
Dependent				
Completion	0.987	0.893	0	2
Independent				
Scholarship Type				
Palmetto Fellows	0.052	0.222	0	1
LIFE	0.419	0.493	0	1
HOPE	0.087	0.282	0	1
Institution Type				
2-year Institution	0.478	0.500	0	1
Research	0.148	0.355	0	1
Comprehensive Teaching	0.225	0.418	0	1
2-year USC Campus	0.030	0.169	0	1
Technical College	0.431	0.495	0	1
Independent Senior Institution	0.149	0.356	0	1
Independent 2-year Institution	0.170	0.131	0	1
Gender				
Male	0.427	0.495	0	1
High School				
HS Rank: Top 10%	0.113	0.316	0	1
HS Rank: 20-30%	0.178	0.382	0	1
HS Rank: 40-50%	0.114	0.318	0	1
HS Rank: Below 50%	0.110	0.313	0	1
Race				
Nonresident Alien	0.000	0.019	0	1
Hispanic	0.020	0.141	0	1
American Indian/Alaska Native	0.004	0.066	0	1
Asian/Pacific Islander	0.014	0.117	0	1
Black/African American	0.301	0.459	0	1
White, non-Hispanic	0.631	0.483	0	1
Unknown	0.029	0.169	0	1
Location/Development: SC Economic Corridors				
I-95 Corridor	0.223	0.416	0	1
Upstate SC Alliance	0.291	0.454	0	1
Charleston Regional Development Alliance	0.133	0.339	0	1
North Eastern Strategic Alliance	0.145	0.352	0	1
TheLink	0.029	0.168	0	1
Southern Carolina Regional Development Alliance	0.053	0.225	0	1
Central SC Alliance	0.200	0.400	0	1
Economic Development Partnership	0.045	0.208	0	1
I-77 Alliance	0.073	0.261	0	1
By Year				
2002	0.082	0.274	0	1
2003	0.086	0.281	0	1

2004	0.086	0.281	0	1
2005	0.088	0.283	0	1
2006	0.089	0.285	0	1
2007	0.093	0.290	0	1
2008	0.090	0.286	0	1
2009	0.100	0.300	0	1
2010	0.097	0.296	0	1
2011	0.097	0.295	0	1
2012	0.093	0.290	0	1

Note. While included in the original models, the variables Unknown and Independent 2-year Institution were ultimately omitted due to collinearity.

most populous racial category was Black/African American at 30.1%. Those whose racial identification was unknown sat at 2.9%, well above all other racial minorities who were 2% or less of the sample.

Regarding high school rank, most students fell between the top 20% and the top 50%. Only 11.3% fell in the top 10% of their graduating class. Meanwhile, 11.0% were in the bottom 50%.

In examining location, it could be determined that most students in the sample originated from the Upstate SC region, I-95 Corridor, and Central SC region. Of the sample, 29.1% of resided in the Upstate, while the I-95 Corridor followed with 22.3% of the sample. Those originally from Central SC were 20% of the sample.

Lastly, those students who were awarded merit-based aid from 2002 to 2006 constituted 8.2% to 8.9% of the sample each year respectively. From 2007-2012, the averages increased to anywhere from 9.0% to 10.0% each year.

Concerning fit, the model that I used to analyze the effect of merit-based aid and other external factors on completion fit the data relatively well, based upon the model's pseudo R^2 statistic as reported in Table 3.

Table 3

Fit for Year-Specific Model #1

Descriptive statistics	Data
N	320,015
Log Likelihood	-262,623
Pseudo R2	0.223

Year-Specific Regression Model #1 (Yearly Dummies)

Scholarship. Upon examining the highly statistically significant results for scholarship type, I found that receiving the Palmetto Fellows, LIFE, or HOPE scholarship had a positive impact on a student; however, there is a greater impact among students who have completed 4-year bachelor's degree programs than 2-year certificate, diploma, or associates programs.[8] That being said, positive effects were still observable at the 2-year academic program level, *ceteris paribus* (see Table 4).

Students who were Palmetto Fellows recipients were 23.6% more likely than others to complete an academic program and 27.7% more likely to complete a 4-year academic program. Two-year students are ineligible for the Palmetto Fellows award. Meanwhile, students who were LIFE recipients were 22.9% more likely than others to complete a degree program, 17.7% more likely to complete a 4-year program, and 5.1% more likely to complete a 2-year program. Students who were HOPE recipients were 16.5% more likely than others to complete an academic program and 10.1% more likely to complete a 4-year program. Just as students enrolled in 2-year programs cannot obtain the Palmetto Fellows, such is also the case with the HOPE scholarship. This is particularly interesting as the model showed that HOPE recipients are

[8] Please note that the model includes all full-time, in-state, degree seeking students attending a 2- or 4-year institution.

Table 4

Multinomial Logit Model Pooled by Year for the 2002-2012 Cohorts at 2- and 4-Year Institutions in SC

Variable	No Program Completion (n = 129,729)	4-year Program Completion (n = 125,590)	2-year Program Completion (n = 64,696)
Scholarship Type			
Palmetto Fellows	-0.236***	0.277***	-0.041***
	(0.008)	(0.005)	(0.008)
LIFE	-0.229***	0.177***	0.051***
	(0.002)	(0.002)	(0.002)
HOPE	-0.165***	0.101***	0.064***
	(0.004)	(0.003)	(0.004)
Institution Type			
2-year Institution	-0.564***	0.188**	0.376***
	(0.074)	(0.069)	(0.086)
Research	-0.562***	0.443***	0.119
	(0.073)	(0.069)	(0.086)
Comprehensive Teaching	-0.528***	0.374***	0.154+
	(0.073)	(0.069)	(0.086)
2-year USC Campus	0.036***	0.011+	-0.047***
	(0.007)	(0.006)	(0.005)
Technical College	0.121***	-0.138***	0.017**
	(0.007)	(0.006)	(0.006)
Independent Senior Institution	-0.506***	0.387***	0.119
	(0.073)	(0.069)	(0.086)
Gender			
Male	0.045***	-0.001	-0.044***
	(0.002)	(0.001)	(0.001)
High School			
HS Rank: Top 10%	-0.104***	0.063***	0.041***
	(0.006)	(0.004)	(0.006)
HS Rank: 20-30%	-0.028***	-0.014***	0.042***
	(0.005)	(0.003)	(0.005)
HS Rank: 40-50%	0.001	-0.028***	0.027***
	(0.005)	(0.003)	(0.005)
HS Rank: Below 50%	0.024***	-0.033***	0.009+
	(0.005)	(0.003)	(0.005)
Race			
Non-Resident Alien	-0.007	0.008	-0.001
	(0.039)	(0.035)	(0.035)
Hispanic	-0.021**	0.013*	0.008
	(0.007)	(0.006)	(0.006)
American Indian/Alaska Native	0.045***	-0.031**	-0.014+
	(0.012)	(0.012)	(0.011)
Asian/Pacific Islander	-0.046***	0.037***	0.009
	(0.008)	(0.007)	(0.007)

Black/African American	0.047***	-0.022***	-0.025***
	(0.005)	(0.004)	(0.004)
White, non-Hispanic	-0.044***	0.026***	0.018***
	(0.005)	(0.004)	(0.004)
Location/Development: SC Economic Corridors			
I-95 Corridor	-0.007**	-0.011***	0.018***
	(0.002)	(0.002)	(0.002)
Upstate SC Alliance	0.022***	-0.012**	-0.010*
	(0.005)	(0.004)	(0.005)
Charleston Regional Development Alliance	0.003	0.023***	-0.025***
	(0.006)	(0.004)	(0.006)
North Eastern Strategic Alliance	0.036***	-0.034***	-0.002
	(0.006)	(0.004)	(0.006)
TheLink	0.023**	0.000	-0.024***
	(0.007)	(0.006)	(0.007)
Southern Carolina Regional Development Alliance	0.030***	-0.026***	-0.004
	(0.006)	(0.005)	(0.006)
Central SC Alliance	0.004	0.011**	-0.016**
	(0.005)	(0.004)	(0.005)
Economic Development Partnership	0.007	-0.023***	0.015*
	(0.006)	(0.005)	(0.006)
I-77 Alliance	0.032***	-0.013**	-0.019***
	(0.006)	(0.005)	(0.006)
By Year			
2002	-0.117***	0.035***	0.082***
	(0.004)	(0.003)	(0.003)
2003	-0.102***	0.031***	0.071***
	(0.004)	(0.003)	(0.003)
2004	-0.090***	0.027***	0.064***
	(0.004)	(0.003)	(0.003)
2005	-0.086***	0.024***	0.062***
	(0.004)	(0.003)	(0.003)
2006	-0.082***	0.032***	0.050***
	(0.004)	(0.003)	(0.003)
2007	-0.073***	0.029***	0.045***
	(0.004)	(0.003)	(0.003)
2008	-0.052***	0.016***	0.036***
	(0.004)	(0.003)	(0.003)
2009	-0.047***	0.017***	0.030***
	(0.004)	(0.003)	(0.003)
2010	-0.039***	0.011***	0.027***
	(0.004)	(0.003)	(0.003)
2011	-0.019***	0.006+	0.013***
	(0.004)	(0.003)	(0.003)
N	320,015		
Log Likelihood	-262,623		
Pseudo R2	0.223		

Note. + p < .10, * p < .05, ** p < .01, ***p < .001; The variable 2012 was omitted due to collinearity.

6.4% more likely to complete a 2-year program. I am uncertain what would account for this discrepancy.

There was a nearly 13% decrease in likelihood that a student who was a LIFE recipient would complete their 2-year academic program when compared to the 4-year rate. As such, there could be several things driving this decrease between institution types: (a) the demographic make-up of the 2-year population could be distinct enough from the 4-year population to impact performance, (b) the student academic support services offered at 2- and 4-year institutions could be dissimilar to the detriment of those in 2-year programs, and/or (c) there is something inherently different about 2-year programs that makes it more difficult to complete.

Institution type. On the 4-year front, those attending a research institution were 56.2% more likely than others to complete their academic program, while 44.3% were more likely to complete their 4-year program.[9] Those students attending 4-year programs at comprehensive teaching institutions were 52.8% more likely than others to complete their degree program, 44.3% more likely than others to earn a bachelor's degree, and 11.9% more likely than others to complete their 2-year program. Meanwhile, students attending independent senior institutions are 50.6% more likely than others to complete their academic program and 38.7% more likely than others to complete their 4-year program.

Students who attended a 2-year institution were 56.4% more likely than others to complete their academic programs. Students attending 2-year institutions were also 18.8% more likely than others to complete a 4-year academic program and 37.6% more likely to complete a 2-year academic program. Students attending one of the 2-year USC campuses were 3.6% less likely than others to complete their academic programs. Curiously, they were also 1.1% *more*

[9] This is based on the first program in which the student enrolls. It is feasible that a student could start at a 4-year college and transfer to a 2-year institution and earn a 2-year degree.

likely than others to complete their 4-year academic program and 4.7% *less* likely to complete their 2-year academic program. Those attending a technical college were 12.1% less likely than others to complete their academic program, 13.8% less likely to complete their 4-year academic program, and 1.7% more likely than others to complete their 2-year program.

Student characteristics (gender, race, and high school rank). Some student characteristics had a noticeable impact on academic success. Gender appears to be one of such characteristics, when observing no program completion and 2-year program completion. Students who are male were 4.5% more likely than women not to complete their academic program. Of those males, 4.4% were less likely than women to complete their 2-year academic program.

Race had a somewhat scattered effect, though the general trend was minority students had higher rates of noncompletion than the rates of White students. Students who are American Indian/Alaska Natives were 4.5% less likely than others to complete their academic programs and 3.1% less likely to complete their 4-year programs. Those who identified as Asian/Pacific Islander were 4.6% more likely than others to complete their academic program. Yet, 3.7% of Asian/Pacific Islander students were more likely than others to complete their 4-year academic programs. Students who are Hispanic were 2.1% more likely than others to complete their academic programs and 1.3% more likely to complete their 4-year programs. Combined, the racial categories of American Indian/Alaska Native, Asian/Pacific Islander, nonresident alien, and Hispanic equal 3.88% of the total 2018 South Carolina population. Black/African American students, who made up 30.12% of the sample and were reflective of 27.1% of South Carolina's 2018 population, were 4.7% less likely than others to complete their academic programs. They were also 2.2% less likely to complete their 4-year programs and 2.5% less likely to complete

their 2-year programs. White, non-Hispanic students, who made up 63.08% of the sample and reflected 63.7% of South Carolina's 2018 population, were 4.4% more likely to complete their academic program (U.S. Census, 2018). 2.6% were more likely to complete their 4-year program and 1.8% were more likely to complete their 2-year program.

High school rank had some variable returns on academic program completion. The general trend was students in the top 10% were more likely to complete their academic programs, whether 2- or 4-year. Specifically, those who graduated in the top 10% of their high school classes were 10.4% more likely to complete their academic program. Of those who graduated in the top 10% of their high school classes, 6.3% were more likely to complete their 4-year programs and 4.1% were more likely to complete their 2-year programs. However, those in the top 20 to 50% were more likely to complete their 2-year programs, rather than 4-year. Students in the top 20 to 30% were 2.8% more likely to complete their academic programs. Yet, they were 1.4% less likely to complete their 4-year programs and 4.2% more likely to complete their 2-year programs. This trend continued among the top 40 to 50% as 2.8% were less likely to complete their 4-year programs and 2.7% were more likely to complete their 2-year programs. Students who graduated in the lower 50% of their high school classes were less likely to complete a program at all, as 2.4% were less likely to complete their programs and 3.3% were less likely to complete their 4-year programs.

Socioeconomics. When observing loose socioeconomic variables tied to county origin and grouped into the I-95 Corridor region (see Figure 1) and the state's economic development regions (see Figure 2), there does not seem to be a specific geographic pattern or trend. Instead, it appears that there is more of a buckshot pattern, generally covering all of the state. This is likely capturing the underdevelopment of most of the state. Per the South Carolina Department of

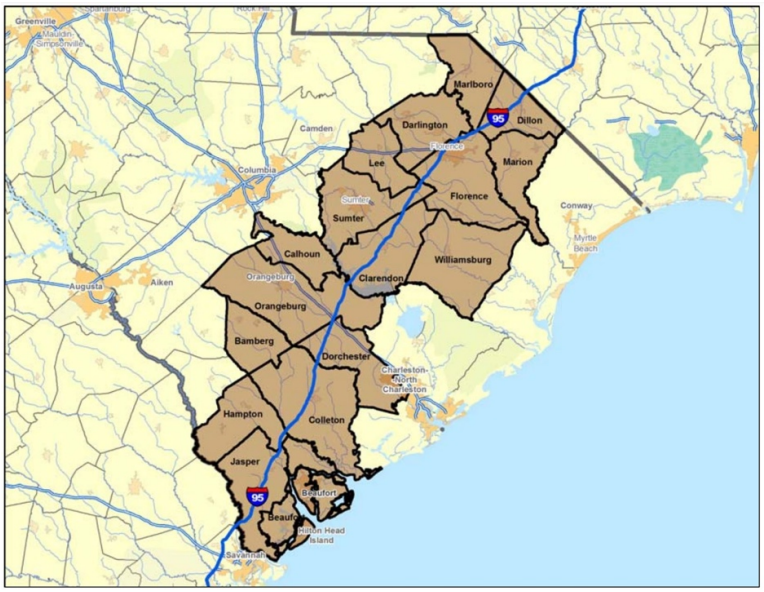

Figure 1. Counties in the I-95 corridor. Reprinted from Moore, T., & Lawrence, S. (2009). *Creating greater opportunity in South Carolina's I-95 corridor: A human needs assessment.* Florence, SC: Francis Marion University.

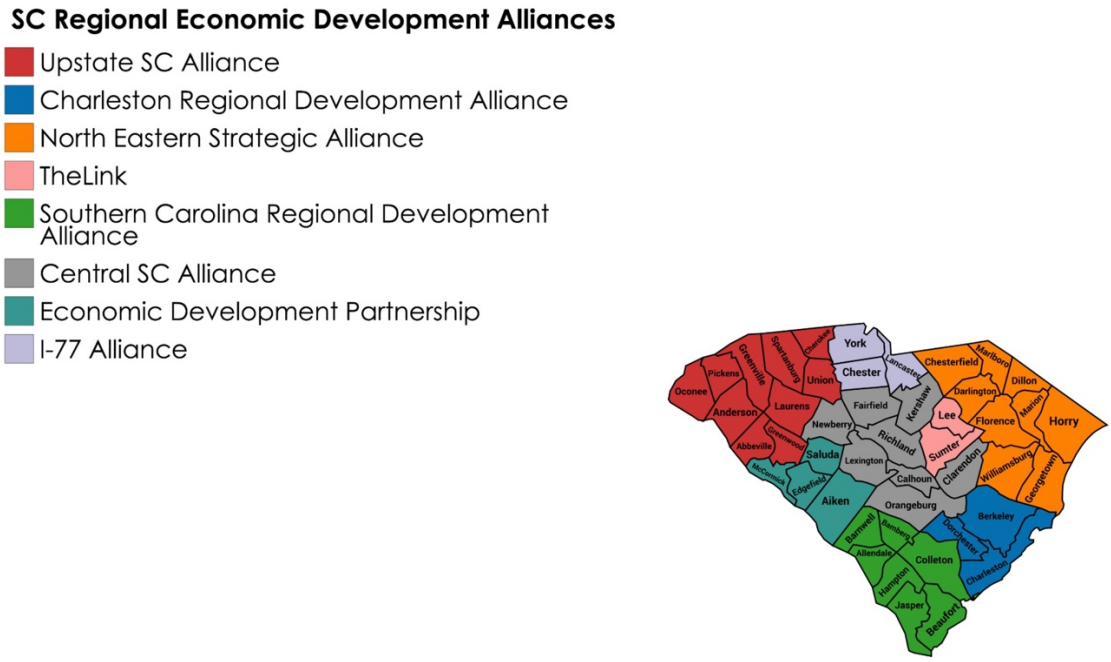

Figure 2. South Carolina Regional Economic Development Alliances. Reprinted from SC Connect. (2019). Resources. Retrieved from https://scconnect.us/resources-sc/

Revenue's 2012 county development rankings (see Table 5), 29 of South Carolina's 46 counties were classified as distressed, least developed, or underdeveloped. The remaining 17 counties

were classified as moderately developed or developed (South Carolina Department of Revenue, 2013). Therefore, much of the state has been economically disadvantaged for some time. Further exacerbating uneven development, local city codes and ordinances have perpetuated the urban-rural divide (Behre & Alani, 2018).

Table 5

2012 South Carolina County Development Rankings

Distressed	Least Developed	Under Developed	Moderately Developed	Developed
Allendale	Abbeville	Calhoun	Anderson	Aiken
Bamberg	Cherokee	Chester	Beaufort	Charleston
Barnwell	Fairfield	Colleton	Berkeley	Dorchester
Chesterfield	Greenwood	Darlington	Georgetown	Florence
Clarendon	Hampton	Edgefield	Kershaw	Greenville
Dillon	Jasper	Horry	Newberry	Lexington
Lancaster	Laurens	Pickens	Oconee	
Lee	Orangeburg	Sumter	Richland	
Marian	Union		Saluda	
Marlboro			Spartanburg	
McCormick			York	
Williamsburg				

Note. Reprinted from South Carolina Department of Revenue. (2013). SC Information Letter #12-19 (Revised). Retrieved from https://dor.sc.gov/resources-site/lawandpolicy/Advisory%20Opinions/IL12-19.pdf#search=information%20letter%20%2312%2D19

Students who originated from the I-95 Corridor were 0.7% more likely than others to complete their academic programs. However, these students were more likely to complete a 2-year program. In fact, 1.1% were less likely to complete their 4-year programs, while 1.8% were more likely to complete their 2-year programs. This information is not surprising given the social and economic breakdown of the 17 counties that make up the region, 14 of which were classified in 2012 as underdeveloped, least developed, or distressed (Moore & Lawrence, 2009).

Students who are from counties that make up the Upstate SC Alliance development region (i.e., Abbeville, Anderson, Cherokee, Greenville, Greenwood, Laurens, Oconee, Pickens,

Spartanburg, and Union) were 2.2% less likely than others to complete their academic program. Specifically, 1.2% were less likely to complete their 4-year programs and 1.0% were less likely to complete their 2-year programs. Given that six of the ten counties in the alliance are either underdeveloped or least developed, a dip in completion is not out of line with prior research.

The outcomes for the students from the counties that constitute the Charleston Regional Development Alliance (i.e., Berkeley, Charleston, and Dorchester) reflect the more developed economic surroundings as 2.3% were more likely to complete their 4-year programs and 2.5% less likely to complete their 2-year programs. Both Dorchester and Charleston counties are classified as developed, while Berkeley is moderately developed.

Student completion rates of those from the North Eastern Strategic Alliance development region counties (i.e., Chesterfield, Darlington, Dillon, Florence, Georgetown, Horry, Marion, Marlboro, and Williamsburg) also reflect the primarily distressed or underdeveloped economic environment. They were 3.6% less likely to complete their academic programs, 3.4% less likely to complete their 4-year academic programs, and 0.2% less likely to complete their 2-year academic programs. Of the nine counties in the region, five are classified as distressed or the most economically disadvantaged.

Completion rates from students originating from the two economically depressed counties making up TheLink development region, Lee and Sumter, followed trends previously mentioned. Of students in that area, 2.3% were less likely to complete their academic programs and 2.4% were less likely to complete their 2-year academic programs. Students from Allendale, Bamberg, Barnwell, Beaufort, Colleton, Hampton, and Jasper counties, which make up the Southern Carolina Regional Development Alliance, followed a similar pattern as 3.0% were less

likely to complete their academic programs, while 2.6% were less likely to complete their 4-year programs.

Students from counties that make up the Central SC Alliance region (i.e., Calhoun, Clarendon, Fairfield, Kershaw, Lexington, Newberry, Orangeburg, and Richland) were 1.1% more likely to complete a 4-year academic program, while they were 1.6% less likely to complete a 2-year academic program. Meanwhile, those from counties in the Economic Development Partnership (i.e., Aiken, Edgefield, Saluda, and McCormick), were 2.3% less likely to complete their 4-year academic programs and 1.5% more likely to complete their 2-year academic programs. Interestingly, both the Central SC Alliance and Economic Development Partnership regions have an even or almost even split of counties that are both developed and underdeveloped.

Lastly, students from York, Chester, and Lancaster counties, which make up the I-77 Alliance, were 3.2% less likely to complete their academic programs. The distressed nature of Lancaster county and underdeveloped climate in Chester county likely play a role as 1.3% of students were less likely to complete their 4-year academic programs. However, perhaps more alarmingly, 1.9% were less likely to complete their 2-year academic program.

Year. The model shows results for years 2002 to 2011. When looking at the years associated with no program completion, 4-year program completion, and 2-year program completion, it becomes evident a student is less likely to complete their academic program, regardless of type, with each passing year. In 2002, 11.7% of students were more likely to complete their academic program. With each passing year, that percentage shrank by one to two percentage points. Ultimately, by 2011, only 1.9% of students were more likely to complete their academic programs. As of 2002, 3.5% of students were more likely to complete their 4-year

programs. With decreases of 0.2% to 0.4% each year, by 2011 0.6% were more likely to complete their academic program. Meanwhile, 8.2% of students were more likely than others to complete their 2-year academic program as of 2002. By 2011, the 2-year completion rate was down to 1.3%.

To what could the decreased completion rates be attributed? Given the timeframe, there are a number of potential factors. First, completion could be related to party control, as fiscal conservatives were in office both nationally and statewide until 2008. As fiscal conservatives, it is likely strategic policy choices were made concerning tuition and aid. This could have triggered acute tuition and aid sensitivity that exists among much of the American populace. Secondly, it could also be related to the recession that hit around 2008. Without money to pay for college, students could not complete their programs. Another factor could also be institutional policy changes, like plus-minus grading policies, that may have made it more difficult for certain subpopulations to retain their aid and thereby stay in school. Lastly, this could be reflective of changes in the wider K-12 system and students' academic preparedness as a whole.

Year-Specific Regression Model #2 (By Individual Year)

Just as with the prior logit, the yearly models used to analyze completion fit the data relatively well, per the models' pseudo R^2 statistics (see Tables 6, 7, and 8).

Scholarship. Largely, scholarship recipients were more likely to complete their academic programs as years went by and programs become more established. For instance, Palmetto Fellows recipients were 20.9% more likely than other students to complete their academic program in 2003 versus 27.8% more likely to complete in 2012. With the exception of dips to 19.5% in 2007 and 22.8% in 2010, there was a steady increase each year. Palmetto Fellows

recipients attending a 4-year program largely saw increases from 2003 to 2009, but encountered sporadic decreases in 2008, 2010, and 2011, before achieving stasis in 2012.

With the exception of a slight decrease to 24.5%, LIFE recipients either increased their likelihood to complete or held steady every year. In 2003, LIFE recipients were 20.0% more likely than others to complete their academic programs but were 27.1% more likely by 2012. LIFE recipients attending 4-year institutions completed their programs at increasing rates from 2003-2012. In 2003, 14.4% were more likely to complete their academic program. By 2012, 21.7% were more likely to complete their academic program. Interestingly though, the results are inconsistent for 2-year institutions. While all results are statistically significant, there is no discernable trend to the data.

Recipients of the HOPE scholarship also proved to generally be more likely to complete their academic programs as the years proceeded. With the exception of 2009-2010, there was a steady increase in the likelihood that HOPE recipients would complete their programs. As of 2003, 13.3% of HOPE recipients were more likely to complete their academic program. By 2012, that was 19.8%. This pattern was true to form for HOPE recipients completing programs at 4-year institutions as well. In 2003, 7.5% of recipients were more likely to complete their academic program. This increased to 13.0% by 2012.

Institution type. Despite examining both 4-year and 2-year institutions, only 2-year institutions saw any type of statistically significant impact over time. For instance, with the exception of an inflated likelihood in 2003, those attending a 2-year institution were more likely to complete their 2-year academic program. Likewise, 2-year USC campuses were statistically significant but had no discernable trend across years. Meanwhile, students who attended technical colleges were more likely not to complete their academic programs as the years went

by. In 2003, 10.3% of students who attended a technical college did not complete their academic program, while that increased to 12.0% by 2012.

Student characteristics (gender, race, and high school rank). Gender was statistically significant for those not completing their academic program, and students completing 2-year programs. For students who did not complete their degrees, males became more likely to complete their academic programs over time. However, they were still more likely not to complete than females were. In 2003, males were 5.6% more likely not to complete their academic programs. However, by 2012, males were only 2.7% more likely not to complete their academic programs. Those completing 2-year programs followed the same trend. Starting at 5.5% in 2003, males ended up at 1.2% in 2012.

While there does not seem to be a temporal element related to race, it does appear that being in the top 10% of one's high school graduating class is statistically significant across time. The data does not display a consistent trend across completion categories (i.e., did not complete, 2-year program, or 4-year program).

Socioeconomics. Despite there being incidence of statistical significance across years and economic development regions, there is no discernable pattern in the noncompletion, 2-year program completion, or 4-year program completion categories. There is also no identifiable trend across categories. It appears that significance is unrelated to any discernable temporal element.

Table 6

Multinomial Logit Models for Students Who Did Not Complete an Academic Program at a 2- or 4-year Institution in SC by Year

Variable	2003	2007	2008	2009	2010	2011	2012
Scholarship Type							
Palmetto Fellows	-0.209***	-0.195***	-0.257***	-0.265***	-0.228***	-0.257***	-0.278***
	(0.031)	(0.028)	(0.026)	(0.027)	(0.026)	(0.024)	(0.023)
LIFE	-0.200***	-0.224***	-0.229***	-0.248***	-0.245***	-0.248***	-0.271***
	(0.008)	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)

HOPE	-0.133***	-0.165***	-0.181***	-0.164***	-0.168***	-0.197***	-0.198***
	(0.013)	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)	(0.013)
Institution Type							
2-year Institution	-0.587***	-2.406	-0.055**	-0.024	-0.058**	-0.037+	-0.034
	(0.088)	(92.926)	(0.021)	(0.021)	(0.020)	(0.020)	(0.021)
Research	-0.600***	-2.452	-0.058***	-0.035*	-0.055***	-0.045***	-0.016
	(0.087)	(95.926)	(0.014)	(0.015)	(0.014)	(0.014)	(0.015)
Comprehensive Teaching	-0.566***	-2.417	-0.033**	-0.008	-0.041***	-0.007	0.021+
	(0.086)	(95.926)	(0.010)	(0.011)	(0.011)	(0.011)	(0.012)
2-year USC Campus	0.014	0.002	0.029	0.048*	0.037	0.013	0.053*
	(0.027)	(0.024)	(0.024)	(0.023)	(0.023)	(0.023)	(0.023)
Technical College	0.103***	0.099**	0.072***	0.064**	0.123***	0.108***	0.120***
	(0.025)	(0.024)	(0.024)	(0.024)	(0.024)	(0.023)	(0.023)
Independent Senior Institution	-0.540***	-2.351	0.000	0.000	0.000	0.000	0.000
	(0.086)	(95.926)	(.)	(.)	(.)	(.)	(.)
Gender							
Male	0.056***	0.044***	0.042***	0.042***	0.040***	0.030***	0.027***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
High School							
HS Rank: Top 10%	-0.116***	-0.103***	-0.142***	0.117***	-0.081***	-0.129***	-0.122***
	(0.021)	(0.019)	(0.021)	(0.020)	(0.020)	(0.020)	(0.019)
HS Rank: 20-30%	-0.039*	-0.008	-0.056**	-0.047**	-0.001	-0.037*	-0.022
	(0.017)	(0.015)	(0.017)	(0.017)	(0.017)	(0.017)	(0.016)
HS Rank: 40-50%	-0.020	0.022	-0.024	-0.027	0.027	0.016	-0.005
	(0.017)	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
HS Rank: Below 50%	0.015	0.028+	-0.020	-0.001	0.058***	0.030+	0.035*
	(0.016)	(0.015)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Race							
Nonresident Alien	-0.079	-0.002	1.766	-0.159	0.124	-0.143	-0.305
	(0.111)	(0.116)	(856.949)	(0.184)	(0.110)	(0.242)	(0.241)
Hispanic	0.061*	-0.047+	-0.019	-0.014	-0.041+	-0.057**	-0.036
	(0.030)	(0.024)	(0.023)	(0.020)	(0.023)	(0.021)	(0.024)
American Indian/Alaska Native	0.086+	0.061	0.018	0.064	-0.037	0.077+	0.041
	(0.047)	(0.044)	(0.040)	(0.041)	(0.042)	(0.041)	(0.042)
Asian/Pacific Islander	0.022	-0.046+	-0.022	-0.064*	-0.092**	-0.078**	-0.081**
	(0.030)	(0.027)	(0.027)	(0.026)	(0.029)	(0.029)	(0.030)
Black/African American	0.041*	0.034*	0.049**	0.057***	0.032+	0.039*	0.064**
	(0.017)	(0.016)	(0.015)	(0.013)	(0.019)	(0.017)	(0.020)
White, non-Hispanic	-0.042*	-0.054***	-0.035*	-0.031*	-0.075***	-0.083***	-0.056**
		(0.015)	(0.015)	(0.012)	(0.018)	(0.016)	(0.020)
Location/Development: SC Economic Corridors							
I-95 Corridor	-0.006	-0.020*	-0.002	-0.011	0.011	0.007	0.006
	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
Upstate SC Alliance	0.022	0.041*	0.027+	0.002	0.073***	-0.013	0.020
	(0.020)	(0.019)	(0.015)	(0.019)	(0.018)	(0.018)	(0.019)
Charleston Regional Development Alliance	0.028	0.019	-0.017	-0.032+	0.037+	-0.035+	-0.014
	(0.021)	(0.020)	(0.016)	(0.019)	(0.019)	(0.013)	(0.020)
North Eastern Strategic Alliance	0.045*	0.055**	0.020	-0.004	0.068***	0.011	0.046*

	(0.021)	(0.020)	(0.016)	(0.020)	(0.019)	(0.019)	(0.020)
TheLink	0.006	0.020	-0.001	-0.019	0.063**	-0.001	-0.000
	(0.027)	(0.025)	(0.023)	(0.024)	(0.024)	(0.024)	(0.025)
Southern Carolina Regional Development Alliance	0.063**	0.067**	0.005	-0.033	-0.044*	-0.029	0.006
	(0.024)	(0.023)	(0.019)	(0.022)	(0.022)	(0.021)	(0.022)
Central SC Alliance	0.013	0.014	0.010	-0.037+	0.039*	-0.028	-0.011
	(0.021)	(0.020)	(0.015)	(0.019)	(0.019)	(0.018)	(0.020)
Economic Development Partnership	0.020	0.038+	-0.017	-0.033	0.032	-0.025	0.017
	(0.023)	(0.022)	(0.019)	(0.022)	(0.021)	(0.021)	(0.022)
I-77 Alliance	-	0.043*	0.027	-0.008	0.084***	-0.005	0.030
	(0.023)	(0.021)	(0.017)	(0.020)	(0.020)	(0.020)	(0.021)
N	27,592	29,676	28,799	32,002	31,135	30,925	29,665
Log Likelihood	-23,351	-24,670	-23,789	-25,632	-24,993	-24,129	-22,557
Pseudo R2	0.208	0.214	0.216	0.238	0.234	0.245	0.256

Note. + p < .10, * p < .05, ** p < .01, ***p < .001; The years 2002 and 2004-2006 are not reported as those regression models either: (a) would not complete their run because the log likelihood value was not concave or (b) the number of observations determined was so small that standard errors were questionable.

Table 7

Multinomial Logit Models for Students Who Completed an Academic Program at a 4-year Institution in SC by Year

Variable	2003	2007	2008	2009	2010	2011	2012
Scholarship Type							
Palmetto Fellows	0.248***	0.285***	0.268***	0.293***	0.291***	0.289***	0.289***
	(0.018)	(0.017)	(0.015)	(0.014)	(0.014)	(0.014)	(0.013)
LIFE	0.144***	0.170***	0.177***	0.203***	0.202***	0.202***	0.217***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
HOPE	0.075***	0.091***	0.112***	0.110***	0.108***	0.119***	0.130***
	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)	(0.009)
Institution Type							
2-year Institution	0.169*	1.148	-0.168**	-0.220***	-0.221***	-0.227***	-0.242***
	(0.083)	(98.945)	(0.017)	(0.016)	(0.006)	(0.016)	(0.016)
Research	0.439***	1.464	0.092**	0.054***	0.026**	0.028***	0.009
	(0.082)	(98.945)	(0.009)	(0.008)	(0.008)	(0.008)	(0.009)
Comprehensive Teaching	0.363***	1.370	0.013+	-0.016*	-0.009	-0.030***	-0.042***
	(0.082)	(98.945)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
2-year USC Campus	0.016	0.039+	0.004	0.022	0.028	0.037*	-0.005
	(0.023)	(0.021)	(0.020)	(0.019)	(0.019)	(0.019)	(0.020)
Technical College	-0.134***	-0.106***	-0.120***	-0.089***	-0.107***	-0.115***	-0.105***
	(0.021)	(0.020)	(0.019)	(0.018)	(0.018)	(0.018)	(0.018)
Independent Senior Institution	0.390***	1.360	0.000	0.000	0.000	0.000	0.000
	(0.082)	(98.945)	(.)	(.)	(.)	(.)	(.)
Gender							
Male	-0.001	0.002	0.003	-0.007	-0.003	-0.013***	-0.015***
	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)

High School							
HS Rank: Top 10%	0.079***	0.069***	0.094***	0.072***	0.061***	0.058***	0.058***
	(0.014)	(0.013)	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)
HS Rank: 20-30%	0.002	-0.018+	0.004	-0.003	-0.012	-0.018	-0.017
	(0.012)	(0.011)	(0.011)	(0.010)	(0.011)	(0.011)	(0.011)
HS Rank: 40-50%	-0.004	-0.023*	-0.011	-0.016	-0.028*	-0.029*	-0.020+
	(0.012)	(0.011)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)
HS Rank: Below 50%	-0.022+	-0.025*	-0.017	-0.014	-0.042***	-0.022*	-0.018
	(0.012)	(0.011)	(0.011)	(0.010)	(0.011)	(0.011)	(0.011)
Race							
Nonresident Alien	0.143+	-0.024	0.778	0.095	-0.038	0.004	0.204
	(0.087)	(0.114)	(418.549)	(0.128)	(0.098)	(0.199)	(0.2.11)
Hispanic	-0.022	-0.004	-0.023	0.017	0.026	0.070***	0.032
	(0.027)	(0.021)	(0.020)	(0.018)	(0.021)	(0.020)	(0.021)
American Indian/Alaska Native	0.018	-0.024	-0.068+	-0.036	0.039	-0.037	-0.027
	(0.046)	(0.041)	(0.036)	(0.039)	(0.038)	(0.041)	(0.040)
Asian/Pacific Islander	-0.028	0.022	-0.016	0.057**	0.051*	0.083***	0.074**
	(0.025)	(0.023)	(0.022)	(0.021)	(0.025)	(0.025)	(0.025)
Black/African American	-0.034*	-0.031*	-0.047***	-0.008	-0.002	0.024	-0.024
	(0.015)	(0.014)	(0.013)	(0.012)	(0.018)	(0.016)	(0.019)
White, non-Hispanic	0.010	0.021	-0.004	0.030*	0.049**	0.078***	0.040*
	(0.014)	(0.013)	(0.012)	(0.012)	(0.017)	(0.016)	(0.018)
Location/Development: SC Economic Corridors							
I-95 Corridor	-0.006	-0.003	-0.019*	-0.005	-0.015*	-0.021**	-0.019**
	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)
Upstate SC Alliance	0.008	-0.053***	-0.041***	-0.015	-0.023+	0.035**	0.019
	(0.016)	(0.015)	(0.011)	(0.0013)	(0.012)	(0.012)	(0.013)
Charleston Regional Development Alliance	0.020	-0.017	0.004	0.029*	0.008	0.080***	0.061***
	(0.017)	(0.016)	(0.012)	(0.014)	(0.013)	(0.013)	(0.014)
North Eastern Strategic Alliance	-0.026	-0.085***	-0.049***	-0.036*	-0.050***	0.009	-0.016
	(0.017)	(0.016)	(0.012)	(0.014)	(0.014)	(0.014)	(0.014)
TheLink	0.019	-0.038+	-0.017	0.000	-0.038*	0.050**	0.037+
	(0.022)	(0.021)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Southern Carolina Regional Development Alliance	-0.033+	-0.087***	-0.039*	-0.023	-0.029+	0.035*	0.015
	(0.019)	(0.019)	(0.015)	(0.016)	(0.016)	(0.016)	(0.017)
Central SC Alliance	0.017	-0.025	-0.014	0.021	0.000	0.055***	0.040**
	(0.016)	(0.016)	(0.011)	(0.013)	(0.013)	(0.013)	(0.013)
Economic Development Partnership	-0.039*	-0.073***	-0.019	-0.030+	-0.017	0.036*	0.002
	(0.019)	(0.018)	(0.015)	(0.016)	(0.015)	(0.016)	(0.016)
I-77 Alliance	-0.004	-0.065***	-0.043***	-0.010	-0.025+	0.057***	0.023
	(0.018)	(0.017)	(0.013)	(0.015)	(0.014)	(0.014)	(0.014)
N	27,592	29,676	28,799	32,002	31,135	30,925	29,665
Log Likelihood	-23,351	-24,670	-23,789	-25,632	-24,993	-24,129	-22,557
Pseudo R2	0.208	0.214	0.216	0.238	0.234	0.245	0.256

Note. + p < .10, * p < .05, ** p < .01, ***p < .001; The years 2002 and 2004-2006 are not reported as those regression models either: (a) would not complete their run because the log likelihood value was not concave or (b) the number of observations determined was so small that standard errors were questionable.

Table 8

Multinomial Logit Models for Students Who Completed an Academic Program at a 2-Year Institution in SC by Year

Variable	2003	2007	2008	2009	2010	2011	2012
Scholarship Type							
Palmetto Fellows	-0.040	-0.090***	-0.012	-0.029	-0.063*	-0.033	-0.012
	(0.030)	(0.029)	(0.026)	(0.026)	(0.026)	(0.023)	(0.022)
LIFE	0.057***	0.054***	0.052***	0.045***	0.043***	0.046***	0.054***
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
HOPE	0.058***	0.074***	0.069***	0.054***	0.061***	0.078***	0.068***
	(0.013)	(0.012)	(0.013)	(0.013)	(0.012)	(0.012)	(0.013)
Institution Type							
2-year Institution	0.417***	1.257	0.223***	0.244***	0.280***	0.263***	0.276***
	(0.113)	(120.920)	(0.016)	(0.016)	(0.016)	(0.015)	(0.016)
Research	0.161	0.987	-0.034*	-0.019	0.029	0.017	0.007
	(0.112)	(120.920)	(0.014)	(0.015)	(0.014)	(0.013)	(0.014)
Comprehensive Teaching	0.204+	1.047	0.020+	0.024*	0.050***	0.037***	0.020+
	(0.112)	(120.920)	(0.010)	(0.011)	(0.011)	(0.011)	(0.012)
2-year USC Campus	-0.031	-0.041*	-0.032+	-0.070***	-0.065***	-0.050**	-0.048**
	(0.020)	(0.017)	(0.018)	(0.017)	(0.017)	(0.016)	(0.015)
Technical College	0.031	0.007	0.048+	0.025	-0.016	0.007	-0.016
	(0.022)	(0.020)	(0.020)	(0.020)	(0.019)	(0.019)	(0.018)
Independent Senior Institution	0.149	0.991	0.000	0.000	0.000	0.000	0.000
	(0.112)	(120.920)	(.)	(.)	(.)	(.)	(.)
Gender							
Male	-0.055***	-0.046***	-0.044***	-0.035***	-0.037***	-0.016***	-0.012**
	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
High School							
HS Rank: Top 10%	0.037+	0.034+	0.048*	0.046*	0.020	0.072***	0.064***
	(0.020)	(0.018)	(0.020)	(0.020)	(0.019)	(0.019)	(0.018)
HS Rank: 20-30%	0.038*	0.026+	0.052**	0.051**	0.012	0.055***	0.039*
	(0.017)	(0.016)	(0.017)	(0.017)	(0.016)	(0.017)	(0.016)
HS Rank: 40-50%	0.024	0.001	0.035*	0.042*	0.001	0.012	0.025
	(0.018)	(0.016)	(0.017)	(0.017)	(0.016)	(0.017)	(0.016)
HS Rank: Below 50%	0.006	-0.003	0.037*	0.015	-0.015	-0.008	-0.018
	(0.017)	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Race							
Nonresident Alien	-0.064	0.026	-2.545	0.064	-0.085	0.139	0.102
	(0.121)	(0.118)	(1275.498)	(0.174)	(0.109)	(0.166)	(0.161)
Hispanic	-0.039	0.051*	0.042*	-0.003	0.015	-0.012	0.004
	(0.028)	(0.021)	(0.020)	(0.016)	(0.019)	(0.017)	(0.019)
American Indian/Alaska Native	-0.104*	-0.037	0.050	-0.028	-0.002	-0.040	-0.015
	(0.046)	(0.041)	(0.033)	(0.034)	(0.034)	(0.034)	(0.032)
Asian/Pacific Islander	0.007	0.024	0.038+	0.007	0.041+	-0.005	0.007
	(0.028)	(0.024)	(0.023)	(0.021)	(0.024)	(0.023)	(0.024)
Black/African American	-0.008	-0.003	-0.002	-0.049***	-0.031+	-0.064***	-0.040*
	(0.016)	(0.014)	(0.014)	(0.010)	(0.016)	(0.013)	(0.016)

White, non-Hispanic	0.032*	0.032*	0.039**	0.001	0.026+	0.004	0.016
	(0.016)	(0.014)	(0.013)	(0.009)	(0.015)	(0.013)	(0.015)
Location/Development: SC Economic Corridors							
I-95 Corridor	0.011	0.023***	0.020**	0.016*	0.004	0.014*	0.013+
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)
Upstate SC Alliance	-0.030	0.012	0.014	0.014	-0.050**	-0.023	-0.039*
	(0.021)	(0.019)	(0.015)	(0.019)	(0.018)	(0.017)	(0.019)
Charleston Regional Development Alliance	-0.047*	-0.002	0.013	0.004	-0.045*	-0.045*	-0.047*
	(0.022)	(0.020)	(0.016)	(0.020)	(0.018)	(0.018)	(0.019)
North Eastern Strategic Alliance	-0.019	0.031	0.029+	0.040*	-0.018	-0.020	-0.030
	(0.022)	(0.020)	(0.016)	(0.020)	(0.018)	(0.018)	(0.020)
TheLink	-0.024	0.018	0.019	0.019	-0.025	-0.049*	-0.037
	(0.026)	(0.023)	(0.021)	(0.023)	(0.022)	(0.022)	(0.023)
Southern Carolina Regional Development Alliance	-0.030	0.020	0.034+	0.056**	-0.016	-0.006	-0.021
	(0.024)	(0.022)	(0.018)	(0.021)	(0.020)	(0.020)	(0.021)
Central SC Alliance	-0.030	0.011	0.004	0.017	-0.039*	-0.028	-0.029
	(0.021)	(0.019)	(0.015)	(0.019)	(0.018)	(0.017)	(0.019)
Economic Development Partnership	0.018	0.035	0.035*	0.063**	-0.015	-0.011	-0.019
	(0.023)	(0.021)	(0.018)	(0.021)	(0.020)	(0.019)	(0.021)
I-77 Alliance	-0.040+	0.021	0.017	0.018	-0.060**	-0.052**	-0.053**
	(0.023)	(0.020)	(0.017)	(0.020)	(0.019)	(0.018)	(0.020)
N	27,592	29,676	28,799	32,002	31,135	30,925	29,665
Log Likelihood	-23,351	-24,670	-23,789	-25,632	-24,993	-24,129	-22,557
Pseudo R2	0.208	0.214	0.216	0.238	0.234	0.245	0.256

Testing the Fit of Models

To test the robustness and sensitivity of the state-level multinomial logit models, I ran both Wald tests to determine if the fit of the models could be improved and a number of auxiliary logits taking out specific independent variables to see if the primary explanatory variables' results were substantively impacted. I first ran a Wald test on the multinomial logit without year dummies. A Wald test was chosen as it tests "the null hypothesis is equal to some value" (UCLA Statistical Consulting Group, 2019, para. 12). This effectively tells you if your model is better than no model at all.

I found the effects of scholarship type, institution type, gender, and high school rank on completion to be significant at the 0.001 level. The effect of a number of the South Carolina

economic corridors on completion was only significant at the 0.05 level. Interestingly, all races except for nonresident aliens, Hispanics, and American Indian/Alaska Natives were significant at the 0.001 level and had an effect on completion. Non-resident aliens, Hispanics, and American Indian/Alaska Natives were not statistically significant.

A second Wald test was run on the multinomial logit that included year dummy variables. Like the first, scholarship type, institution type, gender, and high school rank were all significant at the 0.001 level, thereby having an effect on completion. Once again, a number of South Carolina economic corridors were significant at the 0.05 level. All races, except for non-resident aliens, were either statistically significant at the 0.001 level (Asian/Pacific Islander, Black/African American, and White) or the 0.05 level (Hispanics and American Indian/Alaska Native). Wald tests run on multinomial logits by cohort year displayed no consistent trend, other than the effect of all three scholarship types on completion at the 0.001 level.

In examining the logits and Wald tests, it appeared that the most volatile variables were the race and socioeconomic indicators. In taking racial or socioeconomic variables out of the multinomial logits, I identified several trends:

- Any change to racial or socioeconomic variables caused a was associated with of direction in Palmetto Fellow recipients' completion rates for 2- and 4-year programs;
- Any change to racial or socioeconomic variables was associated with a large decline in LIFE 4-year program completion rates and a large increase in 2-year completion rates;
- Any change to racial or socioeconomic variables was associated with a decline in HOPE 4-year program completion rates and a significant increase in 2-year completion rates; and

- Socioeconomic variables alone make little difference in rates of no academic program completion, however there is great change when both either: (a) all racial categories or (b) all socioeconomic and racial categories are withheld from the model.

Institution-Level Results

Descriptive Analysis

To see if the macro trends identified at the state level are transferable to individual 4-year institutions or if each institution is influenced by explanatory factors in divergent ways specific to their own individual context, the 2012-2013 freshman cohort at a mid-sized, public university in South Carolina was examined. The sample size of 1,051 captures all in-state students; yet, the sample is only 0.42% of the total enrolled students in South Carolina during the 2012-2013 academic year (SCCHE, 2018c).

Though relatively small compared to the state-level sample, the institutional-level sample has some clear trends (see Table 9). First, 56% of students graduated, thereby completing their academic programs. Most of those students were LIFE scholarship recipients, with an average of 55.8%. Recipients of the HOPE scholarship were next at 24.6%. The fewest students received the Palmetto Fellows scholarship with a mean of 8.7%.

The sample was heavily female, with only 27% of students being male. There were also two primary racial identifications: White (55.2%) and Black/African American (35.9%). The student population often received some monetary assistance from their families as the average EFC was $11,917.76. Meanwhile, 48.9% of students still received a Pell grant. Interestingly, 92.4% of students stayed on campus during their first semester.

In terms of high school achievement, the average ACT score was 19.972. Therefore, most students earned either a 19 or 20 on the test. Students were also most likely to be in the top 20-

30% of their graduating class. In fact, 40.2% were. Meanwhile, only 19.8% were in the top 10% in high school, and 10.9% fell into the bottom 50%.

Table 9

Summary Statistics for the 2012-2013 Freshman Cohort at a Mid-Sized SC Public Institution

Variable	Mean	Std. Dev.	Min	Max
Dependent				
Completion	0.560	0.497	0	1
Independent				
Scholarship Type				
Palmetto Fellows	0.087	0.281	0	1
LIFE	0.558	0.497	0	1
HOPE	0.246	0.431	0	1
Financial				
Expected Family Contribution	11917.76	17313.14	0	99999
Pell Grant Recipient	0.489	0.500	0	1
High School				
ACT Score	19.972	4.308	10	34
HS Rank: Top 10 %	0.198	0.399	0	1
HS Rank: 20-30%	0.402	0.491	0	1
HS Rank: 40-50%	0.247	0.432	0	1
HS Rank: Below 50%	0.109	0.312	0	1
Gender				
Male	0.270	0.444	0	1
Race				
Black/African American	0.359	0.480	0	1
White	0.552	0.498	0	1
All Other Races	0.089	0.286	0	1
First Semester Residency				
On-Campus	0.924	0.265	0	1
Location/Development: SC Economic Corridors				
I-95 Corridor	0.169	0.375	0	1
Upstate SC Alliance	0.215	0.411	0	1
Charleston Regional Development Alliance	0.125	0.330	0	1
North Eastern Strategic Alliance	0.101	0.301	0	1
TheLink	0.031	0.174	0	1
Southern Carolina Regional Development Alliance	0.024	0.152	0	1
Central SC Alliance	0.245	0.430	0	1
Economic Development Partnership	0.030	0.172	0	1
I-77 Alliance	0.145	0.352	0	1
N	1,051			

Note. While included in the original models, the variable All Other Races was ultimately omitted due to collinearity.

Of the student population, nearly a quarter (24.5%) came from Central SC. Upstate SC was not far behind at 21.5%. Yet, significant numbers of students have also come from the counties along the I-95 Corridor and those that make up the I-77 Alliance. 16.9% of students came from the I-95 Corridor, while 14.5% of students originated from York, Chester, and Lancaster counties that constitute the I-77 Alliance.

Logistic Regression

Scholarship. Unlike the multinomial logistic regressions run at the state level, only two of the three merit-based financial aid awards were found to be statistically significant at the institution level (see Table 10). Palmetto Fellows recipients had the statistically significant result of being 58.3% more likely than others to complete their academic programs. Meanwhile, LIFE recipients were 26.7% more likely than others to complete their programs. However, LIFE recipient results were only significant at the 0.05 level. Recipients of the HOPE scholarship's rates of completion on do not appear to have benefitted in any measurable way from the scholarship at the institution level, as the result associated with them was not statistically significant.

Financial/socioeconomics. When observing financial attributes, an interesting phenomenon occurred where EFC was statistically significant at 0.0%. This leads to me to believe that one or more of the other financial or socioeconomic components may be inadvertently skewing this result. Fascinatingly, it appears that being a Pell grant recipient does not appear one of them, as it did not have a statistically significant effect. Three of the economic regional development regions (i.e., Charleston Regional Development Alliance, North Eastern Strategic Alliance, and TheLink) appear to be correlated with program completion.

Students from the Charleston Alliance were 22.8% less likely to complete their academic programs, while those from the North Eastern Alliance were 27.9% less likely to complete their programs. Students from TheLink were 32.9% less likely to complete their academic programs. These results are intriguing as both the North Eastern Alliance and TheLink are among the least developed economic development regions in the state per the 2012 South Carolina county development rankings. Thus, it is not surprising to see the North Eastern completion trends mirroring 4-year rates from the multinomial logit.

What is unusual is to see not only significance but also a directional shift in TheLink's results in the logistic regression compared to the multinomial logit. Similarly, an unexplained directional shift occurred with the Charleston Alliance. As one of the more developed economic regions, one would have anticipated the trends from the multinomial logit to remain intact. This leads me to wonder if students attending this particular institution from the Charleston area are not originating from the more developed areas in the development region but instead coming from more economically depressed areas in the region.

Student characteristics. None of the variables related to student characteristics such as gender, race, high school attainment, or campus residency had any measurable effect on program completion.

Testing the Fit of Models

To test the fit of the institution-level logistic regression model, I first determined the percentage of cases predicted correctly via lstat. 63.37% of cases were classified correctly and incorrectly, using a cutoff point of 50% for the predicted probability. As the percentage of cases correctly predicted was not as robust as I had hoped, I ran Wald tests to determine if any independent variables were detracting from the model.

When examined together, the three scholarships had a significant effect on completion at the 0.001 level. However, when run as individual Wald tests, each of the scholarships had divergent effects on completion. Only the Palmetto Fellows was significant at the 0.001 level, while LIFE was significant at the 0.05 level. HOPE was not statistically significant when run alone. A similar trend occurred with financial variables EFC and Pell grant recipient. Together, they had a significant effect on completion at the 0.001 level, yet when separated only EFC was found to be significant at the 0.001 level. Pell grant status was insignificant. Once again, when calculated together, high school attributes (ACT score and high school rank) were significant at the 0.05 level. However, alone neither ACT score nor any of the rank dummies were statistically significant. The location/socioeconomic variables, South Carolina Economic Corridors, also proved to be statistically insignificant unless run as Wald tests individually. Only then was the Charleston Alliance found to be significant at the 0.1 level and the North Eastern and TheLink Alliances prove to be significant at the 0.05 level. Gender, race, and residency were consistently insignificant.

Upon determining which variables seemed to contribute the least to enhancing the model's fit, I re-ran logits taking out specific variables to see if predictability could be enhanced. Despite running a number of combinations, no significant improvement was made to the model. Thus, there must be some characteristic that is not yet captured in the logistic regression.

Table 10

Logit Model for Academic Program Completion of the 2012-2013 Freshman Cohort at a Mid-Sized SC Public Institution

Variable	Completion
Scholarship Type	
Palmetto Fellows	0.583***
	(0.143)
LIFE	0.267*
	(0.110)
HOPE	0.151
	(0.104)
Financial	
Expected Family Contribution	0.000*
	(0.000)
Pell Grant Recipient	-0.058
	(0.038)
High School	
ACT Score	0.001
	(0.004)
HS Rank: Top 10 %	0.092
	(0.089)
HS Rank: 20-30%	-0.039
	(0.083)
HS Rank: 40-50%	-0.028
	(0.084)
HS Rank: Below 50%	-0.127
	(0.089)
Gender	
Male	0.008
	(0.034)
Race	
African American	0.027
	(0.056)
White	-0.051
	(0.053)
First Semester Residency	
On-Campus	0.112
	(0.072)
Location/Development: SC Economic Corridors	
I-95 Corridor	0.031
	(0.057)
Upstate SC Alliance	-0.175
	(0.117)
Charleston Regional Development Alliance	-0.228+
	(0.122)
North Eastern Strategic Alliance	-0.279*
	(0.126)

TheLink	-0.329*
	(0.149)
Southern Carolina Regional Development Alliance	-0.207
	(0.154)
Central SC Alliance	-0.177
	(0.116)
Economic Development Partnership	-0.217
	(0.142)
I-77 Alliance	-0.123
	(0.128)
N	1,051
Log Likelihood	-661
Pseudo R2	0.083

Note. + $p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$. Dependent variable is academic program completion. Though the variable "All Other Races" was included in the model, it was omitted due to collinearity.

CHAPTER 5

DISCUSSION

This quantitative study examined the effect of South Carolina's merit-based financial aid awards on 2- and 4-year academic program completion. The primary goal of this research endeavor was to determine if state merit-based aid is positively or negatively correlated with program completion of students. This is particularly pertinent as questions related to program effectiveness continue to be raised in South Carolina as the state's education lottery revenue falls well below the necessary threshold needed to pay for the entirety of students eligible for one of the three awards: the Palmetto Fellows, LIFE, and HOPE. Thus, taxpayers are collectively forced to pick up the remaining tab, now well over $80 million dollars, to meet the fiscal benchmarks needed to provide all qualifying students with funds (Cope, 2014). The secondary goal was to determine if relationships related to college completion were uniformly felt amongst all student or only certain pockets of students. I desired to find confirmation of such trends amongst subpopulations through quantitative analysis that would help further elucidate prior research.

For almost two decades, merit-based aid has been used to redistribute publicly funded financial aid to reduce fiscal barriers that may impair students from pursuing a higher education. Ostensibly, politically popular lottery-funded models like South Carolina's attempt to solve several challenges simultaneously:

- Offsetting funds that would otherwise solely be appropriated from the state's General Assembly using an elective tax. In doing so, the state is able to continue financing higher education as direct appropriations at both the federal and state levels continue to dwindle;

- Keeping outmigration of the state's brightest and most capable students from happening;
- Increasing access to education and ensuring equity, at least in theory; and
- Incentivizing investment in higher education to build a strong workforce, which pays large economic and social dividends down the line for the state.

Ultimately, the objective of this study was to not only better understand how an economic incentive like merit-based aid can influence educational investment and program completion but to also determine what components surrounding college choice affects those same completion rates. While many studies trying to establish connections between merit aid and academic outcomes, such as completion, have been conducted, the results have widely varied due to each state's distinct program requirements and structure.

Summary of Key Findings

As noted in Chapter 4, year-specific multinomial logit models were run on a sample of 320,015 de-identified student entries from first-year cohorts throughout South Carolina from 2002 to 2012, while a logistic regression model was run on the 2012-2013 freshman cohort sample at a mid-sized, public institution to measure the impact of merit-based aid on the dependent variable of program completion. Each analysis found that there was a significant and positive association with program completion based upon the receipt of a South Carolina merit-based scholarship. It appears receiving merit-based aid has a beneficial effect on college completion, thus answering the primary research question. This falls in line with prior findings about other merit-based aid programs from Henry, Rubenstein, and Bugler (2004), Dynarski (2008), and Scott-Clayton (2011). However, the results of this study were not consistently strong across all institution types.

Several themes materialized in response to the secondary question, examining the impact on subpopulations. The first theme is that there is a distinction between 2- and 4-year institutions. More particularly, there is a difference between the students attending and ultimately graduating from said institutions. The second is that race remains a pertinent mitigating factor concerning completion. Minorities, particularly African Americans, remain less likely to complete their academic programs. Third, a socioeconomic dimension revolving around location and economic development remains in play as students from most of the state, especially counties that remain underdeveloped, were negatively impacted. Lastly, there was a temporal element whereby there was a decrease in completion with each year that passed from 2002 to 2011.

Interpretations

The results of this study, solely about positive or negative impact of aid on completion, add to a select body of literature. Overall the literature, as mentioned in Chapter 2, remains mixed in its assessment of merit aid programs and their effect on completion given program requirements and structure. As such, one cannot say conclusively that completion is enhanced upon receipt of a merit-based aid award. Instead, positive externalities must be contextualized in their state-specific contexts. What can be determined is that in South Carolina, such investment in human capital seems to be a mixed bag. While there is evidence of impact, it appears to not only be mitigated by institution type (2-year or 4-year) but also by time, as effect dwindles with each passing year. The variance of impact can be attributed to demographic factors influencing the incentivization of investment in higher education. Such results suggest human capital theory, as developed by Schultz (1961), is indeed central to understanding these trends. Moreover,

Perna's proposed conceptual model (2006a) helps explain how people make specific choices relative to their social and cultural context.

Limitations

While this analysis via quantitative research was an adequate means of appraising the relationship between South Carolina merit-based financial aid awards and academic program completion, the models had their limitations. A lot of these limitations revolved around the ability to gain access to and the formatting of raw data. First, while the initial receipt of a scholarship is noted, the retention of a particular scholarship is not. Year-to-year retention data were not provided by the SCCHE, and therefore I could not ascertain the number of students who benefitted from state financial support throughout their entire academic careers. Likewise, I was also unable to identify students who were only able to retain their merit-based aid award for a select period of time. In not having access to that information, I can only speak to the impact of initial receipt and not the related impact on persistence.

Second, the SCCHE would not relinquish much data related to high school performance and ability. GPAs, SAT/ACT scores, and general high school information outside of banded class rankings were unavailable. Moreover, socioeconomic indicators, such as estimated family contribution and receipt of the Pell grants, were denied as well. Without those indicators, banded class rankings were used and a proxy socioeconomic variable based on economic development regions was created. However, in not having such information, a level of specificity and accuracy was unfortunately forfeited. As scholars such as Baksh and Hoyt (2001) harken back to high school performance and socioeconomics in their model, it would have been beneficial to not only align more closely with much of the literature but to have ensured a more reliable model.

Third, the current model solely explored first degree completion at the first institution of enrollment. Thus, it does not isolate nor adequately capture the movement of transfer students. Going forward, I would need to determine the number of individuals who transferred between institutions to ensure that any impact has been adequately accounted.

Fourth, I would need to parse out financial benefit versus high school academic aptitude, as the variables currently capture both. The scholarships, particularly the Palmetto Fellows, reward high GPA and high SAT with monetary awards. Some additional information would likely be needed from SCCHE to do so.

Lastly, I would be well served to run a logistic regression on a sample made of a number of cohorts at the same mid-sized, public university. Having only run a regression for one cohort, observations were limited and trends of significance did not appear as anticipated given the literature. Though I cannot be assured that trends would change, having greater explanatory power through a larger sample could have the potential to yield some substantive shifts.

Recommendations and Further Research

While the current study has supported a positive relationship between merit-based aid and completion, it also supports research such as Dynarski (2004) and Heller (2006), asserting there are mitigating factors that influence student outcomes when a student is a merit-aid recipient. Such research notes antecedent conditions, such as race and low-socioeconomic standing, which are not related to merit and help shape the likelihood of not only being a recipient of merit-based aid but also completing college. These findings on race and socioeconomics, alongside those for gender, have been consistent across time. While the human capital model emphasizes that students are more likely to invest in their education if larger economic gains are in reach down the line, this model alone does not account for the social and cultural contexts that shape

students' direct costs and decision making. In introducing Perna's proposed conceptual model to the mix, these multilayered contexts are acknowledged. Going forward, studies should use like frameworks to not only confirm the present results as there is a dearth of peer-reviewed work on South Carolina, but also attempt to accurately ascertain the impact on both students and the policy process writ large.

Future research should also continue to more conclusively assess the impact of merit-based aid on college completion as the literature has been mixed at best due to a lack of common typology. Just as completion is a valuable metric of student academic outcomes, so too is persistence and outmigration. Given the difficulty of retaining scholarships like LIFE and the subsequent desire to curb the state's brain drain, others should attempt to obtain data to better explain these phenomena. Because the lottery-based funding model is a product of policy diffusion, it would be a valuable exercise to see if the trends found in South Carolina mirror those in regional partners and neighboring states such Florida, Georgia, and Tennessee as well. Lastly, it would be worthwhile to see if trends change with the incorporation of improved economic indicators and variables for high school ability.

Conclusion

This study found there was a positive relationship between being a recipient of a South Carolina merit-based financial aid award and academic program completion. However, that effect is not felt equally nor is it felt universally. While policymakers talk a good game about access to higher education and opportunity based on merit, the playing field to obtain aid starts out unleveled. This is particularly true of those who are minorities, from underdeveloped regions and those who enroll in 2-year institutions. The results of this study suggest we must continue to examine the distribution of public investment in higher education.

REFERENCES

ACT. (2018). 2018 ACT/SAT concordance tables. Retrieved from https://www.act.org/content/dam/act/unsecured/documents/ACT-SAT-Concordance-Tables.pdf

Adcox, S. (2014, October 29). SC audit: Lottery-funded scholarships need review. Retrieved from the KSL website: https://www.ksl.com/article/32148595/sc-audit-lottery-funded-scholarships-need-review

Aldrich, J. H., & Nelson, F. D. (1984). *Linear probability, logit, and probit models.* Newbury Park, CA: Sage.

Avery, C., & Hoxby, C. M. (2004). Do and should financial aid packages affect students' college choices? In C. M. Hoxby (Ed.), *College choices: The economics of where to go, when to go, and how to pay for it* (pp. 239-301). Chicago, IL: University of Chicago.

Baksh, A., & Hoyt, J. E. (2001). The effect of academic scholarships on college attendance. *College and University, 76*(4), 3-8. Retrieved from https://www.aacrao.org/research-publications/quarterly-journals/college-university-journal

Becker, G. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy, 70*(5), 9-49. Retrieved from https://www.jstor.org/stable/1829103

Behre, R., & Alani, H. (2018, April 29). South Carolina metro areas are growing but, its cities struggle to keep pace and inequities arise. *The Post and Courier.* Retrieved from https://www.postandcourier.com/news/south-carolina-metro-areas-are-growing-but-its-cities-struggle/article_dc941a7e-3f22-11e8-9e82-dfd4374c2430.html

Berry, W. D., & Feldman, S. (1985). *Multiple Regression in Practice.* Thousand Oaks, CA: Sage.

Bound, J., Groen, J., Kezdi, G., & Turner, S. (2001). *Trade in university training; Cross-state variation in the production and use of college educated labor.* Cambridge, MA: National Bureau of Economic Research.

Box-Steffensmeier, J. M., Brady, H. E., & Collier, D. (Eds.). (2008). *The Oxford handbook of political methodology.* Oxford, England: Oxford University Press.

Buchmann, C., & DiPrete, T. A. (2006). The growing female advantage in college completion: The role of family background and academic achievement. *American Sociological Review, 71*, 515-541. doi:10.1177/000312240607100401

Cohen-Vogel, L., Ingle, W. K., Levine, A. A., & Spence, M. (2008). The "spread" of merit-based college aid. *Educational Policy, 22*, 339-362. doi:10.1177/0895904807307059

Conner, T. W., & Rabovsky, T. M. (2011). Accountability, affordability, access: A review of the recent trends in higher education policy research. *Policy Studies Journal, 39*, 93-112. doi:10.1111/j.1541-0072.2010.00389_7.x

Cope, C. (2014, November 28). Lottery scholarships cost SC taxpayers $80 million. *The State.* Retrieved from https://www.thestate.com/news/politics-government/politics-columns-blogs/the-buzz/article13919672.html

Cornwell, C., & Mustard, D. B. (2001). HOPE scholarship affects where, not whether, students attend college. *Public Policy Research Series: Policy Notes, 2*(10), 1-2. Retrieved from https://athenaeum.libs.uga.edu/bitstream/handle/10724/19095/80.pdf?sequence=1

Cornwell, C., & Mustard, D. B. (2002). HOPE, the brain drain, and diversity: The impact of the scholarship on high achievers and African Americans. *Public Policy Research Series:*

Policy Notes, 3(4), 1-2. Retrieved from https://athenaeum.libs.uga.edu/bitstream/handle/10724/19102/76.pdf?sequence=1

Cornwell, C., & Mustard, D. B. (2005). Evaluating HOPE-style merit scholarships. *Innovation in Education* (pp. 33-38). Cleveland, OH: Federal Reserve Bank of Cleveland. Retrieved from https://www.researchgate.net/profile/Christopher_Berry4/publication/5029170_School_size_and_student_outcomes_a_nontechnical_paper/links/54d243bd0cf25017917da661/School-size-and-student-outcomes-a-nontechnical-paper.pdf#page=37

Cornwell, C., Mustard, D. B., & Sridhar, D. J. (2006). The enrollment effects of merit-based financial aid: Evidence from Georgia's HOPE program. *Journal of Labor Economics, 24*, 761-786. doi:10.1086/506485

Daprile, L. (2018a, March 21). SC high school students may soon have a harder time getting lottery scholarships. *The State.* Retrieved from https://www.thestate.com/news/politics-government/state-politics/article206091814.html

Daprile, L. (2018b, October 12). SC's poor play the lottery, but the wealthier win the scholarships. Here's why. *The State*. Retrieved from https://www.thestate.com/news/lottery/article219049710.html

Datawheel. (2019). South Carolina. Retrieved from https://datausa.io./profile/geo/south-carolina/

Dee, T. S., & Jackson, L. A. (1999). Who loses HOPE? Attrition from Georgia's college scholarship program. *Southern Economic Journal, 66*, 379-390. doi:10.2307/1061149

Delaney, J. A., & Ness, E. C. (2011, November). A state-level merit aid typology. Paper presented at the annual conference of the Association for the Study of Higher Education, Charlotte, North Carolina.

DiPrete, T. A., & Buchmann, C. (2006). Gender-specific trends in the value of education and the emerging gender gap in college completion. *Demography, 43*, 1-24. doi:10.1353/dem.2006.0003

Domina, T. (2014). Does merit aid program design matter? A cross-cohort analysis. *Research in Higher Education, 55*, 1-26. doi:10.1007/s11162-013-9302-y

Doyle, W. R. (2006). Adoption of merit-based student grant programs: An event history analysis. *Educational Evaluation and Policy Analysis, 28*, 259-285. doi:10.3102/01623737028003259

Doyle, W. R. (2010). Does merit-based aid "crowd out" need-based aid? *Research in Higher Education, 51*, 397-415. doi:10.3102/01623737028003259

Duffourc, D. (2006). State-funded college scholarships: General definitions and characteristics. *Review of Policy Research, 23*, 235-248. doi:10.1111/j.1541-1338.2006.00195.x

Dynarski, S. (2002). *The consequences of merit aid.* Cambridge, MA: National Bureau of Economic Research.

Dynarski, S. (2003). Does aid matter? Measuring the effect of student aid on college attainment and completion. *American Economic Review, 93*, 279-288. doi:10.3386/w7422

Dynarski, S. (2004). The new merit aid. In C. M. Hoxby (Ed.), *College choices: The economics of where to go, when to go, and how to pay for it* (pp. 63-100). Chicago, IL: University of Chicago Press.

Dynarski, S. (2005*). Building the stock of college-educated labor*. (NBER Working Paper No. 11604). doi:10.3386/w11604

Dynarski, S. (2008). Building the stock of college-educated labor. *Journal of Human Resources, 34*, 576-610. doi:10.1353/jhr.2008.0020

Education Lottery Act, SC Act No. 59, §2. (2001).

Eliason, S. R. (1993). *Maximum likelihood estimation: Logic and practice.* Newbury Park, CA: Sage.

Ferillo, B. (Director). (2006). *Corridor of Shame* [Motion Picture]. United States: Ferillo & Associates.

Ganderton, P. (1992). The effect of subsidies in kind on the choice of a college. *Journal of Public Economics, 48*, 269-292. doi:10.1016/0047-2727(92)90009-5

Goetz, J., Mimura, Y., Desai, M., & Cude, B. (2008). HOPE or no-HOPE: Merit-based college scholarship status and financial behaviors among college students. *Journal of Financial Counseling and Planning, 19*, 12-19. Retrieved from https://www.afcpe.org/news-and-publications/journal-of-financial-counseling-and-planning/

Goldin, C., Katz, L. F., & Kuziemko, I. (2006). The homecoming of American college women: The reversal of the college gender gap. *Journal of Economic Perspectives, 20*(4), 133-156. doi:10.3386/w12139

Goldrick-Rab, S., Harris, D. N., & Trostel, P. A. (2009). Why financial aid matters (or does not) for college success: Toward a new interdisciplinary perspective. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 24, pp. 1-45). Dordrecht, The Netherlands: Springer.

Goldrick-Rab, S., Kelchen, R., Harris, D. N., & Benson, J. (2016). Reducing income inequality in educational attainment: Experimental evidence on the impact of financial aid on college completion. *American Journal of Sociology, 121*, 1762-1817. doi:10.1086/685442

Groen, J. (2004). The effect of college location on migration of college-educated labor. *Journal of Econometrics, 121*, 125-142. doi:10.1016/j.jeconom.2003.10.002

Gujarati, D. N. (2003). *Basic Econometrics* (4th ed.). New York, NY: McGraw-Hill Higher Education.

Haveman, R., & Smeeding, T. (2006). The role of higher education in social mobility. *The Future of Children, 16*(2), 125-150. doi:10.1353/foc.2006.0015

Hearn, J. (1984). The relative roles of academic, ascribed, & socioeconomic characteristics in college destinations. *Sociology of Education,* (57), 22-30. doi:10.2307/2112465

Heller, D. E. (2006). *Merit aid and college access.* Madison: Wisconsin Center for the Advancement of Postsecondary Education, University of Wisconsin, Madison.

Heller, D. E., & Rasmussen, C. J. (2001). *Merit scholarships and college access: Evidence from two states.* Cambridge, MA: The Civil Rights Project, Harvard University.

Heller, D. E., & Rasmussen, C. J. (2002). Merit scholarships and college access: Evidence from Florida and Michigan. In D. E. Heller, & P. Marin (Eds.), *Who should we help? The negative social consequences of merit scholarships* (pp. 23-40). Cambridge, MA: The Civil Rights Project, Harvard University.

Henry, G. T., Rubenstein, R., & Bugler, D. T. (2004). Is HOPE enough? Impacts of receiving and losing merit-based financial aid. *Educational Policy, 18*, 686-709. doi:10.1177/0895904804269098

Hossler, D., & Gallagher, K. (1987). Studying college choice: A three-phase model and the implications for policy-makers. *College and University, 2*, 207-221. Retrieved from https://www.aacrao.org/research-publications/quarterly-journals/college-university-journal

Kinzie, J., Palmer, M., Hayek, J., Hossler, D., Jacob, S. A., & Cummings, H. (2004). *Fifty years of college choice: Social, political and institutional influences on the decision-making process* (Vol. 5, No. 3). Indianapolis, IN: Lumina Foundation for Education.

Lee, J. (2018). Does merit-based aid promote degree attainment? *KEDI Journal of Educational Policy, 15*(1), 99-118. Retrieved from http://eng.kedi.re.kr/khome/eng/kjep/pubList.do

Leslie, L. L., & Brinkman, P. T. (1987). Student price response in higher education: The student demand studies. *The Journal of Higher Education, 58*, 181-204. doi:10.1080/00221546.1987.11778239

Light, A., & Strayer, W. (2000). Determinants of college completion: School quality or student ability? *The Journal of Human Resources, 35*, 299-332. doi:10.2307/146327

Long, J. S. (1997). *Regression models for categorical and limited dependent variables.* Thousand Oaks, CA: Sage.

Longanecker, D. (2002). Is merit-based student aid really trumping need-based aid? *Change: The Magazine of Higher Learning, 34*(2), 30-37. doi:10.1080/00091380209601843

Marin, P. (2002). Merit scholarships and the outlook for equal opportunity in higher education. In D. E. Heller, & P. Marin (Eds.), *Who should we help? The negative social consequences of merit scholarships* (pp. 112-116). Cambridge, MA: The Civil Rights Project, Harvard University.

Mattern, K., & Wyatt, J. N. (2009). Student choice of college: How far do students go for an education? *Journal of College Admission, 203*, 18-29. Retrieved from https://www.nacacnet.org/news--publications/journal-of-college-admission/

McPherson, M. S., & Schapiro, M. O. (1998). *The student aid game: Meeting need and rewarding talent in American higher education.* Princeton, NJ: Princeton University Press.

Monks, J. (2009). The impact of merit-based financial aid on college enrollment: A field experiment. *Economics of Education Review, 28*, 99-106. doi:10.1016/j.econedurev.2008.03.002

Moore, T., & Lawrence, S. (2009). *Creating greater opportunity in South Carolina's I-95 corridor: A human needs assessment.* Florence, SC: Francis Marion University.

Ness, E. C., & Tucker, R. (2008). Eligibility effects on college access: Under-represented student perceptions of Tennessee's merit aid program. *Research in Higher Education, 49*, 569-588. doi:10.1007/s11162-008-9096-5

Orsuwan, M., & Heck, R. (2009). Merit-based student aid and freshmen interstate college migration: Testing a dynamic model of policy change. *Research in Higher Education, 50*, 24-51. doi:10.1007/s11162-008-9108-5

Palmetto Fellows Scholarship Program and improving undergraduate instruction, SC Act No. 739, §1. (1988).

Parker, F. R. (1996). The damaging consequences of the Rehnquist court's commitment to color-blindness versus racial justice. *The American University Law Review, 45*, 763-773. Retrieved from https://digitalcommons.wcl.american.edu/aulr

Paulsen, M. B., & St. John, E. P. (2002). Social class and college costs: Examining the financial nexus between college choice and persistence. *The Journal of Higher Education, 73*, 189-236. doi:10.1353/jhe.2002.0023

Perna, L. W. (2006a). Studying college access and choice: A proposed conceptual model. In J. Smart (Ed.), *Higher Education: Handbook of Theory and Research* (Vol. 21, pp. 99-157). Dordrecht, The Netherlands: Springer.

Perna, L. W. (2006b). Understanding the relationship between information about college prices and financial aid and students' college-related behaviors. *American Behavioral Scientist, 49*, 1620-1635. doi:10.1177/0002764206289144

Pingel, S., & Sponsler, B. A. (2015). *Redesigning state financial aid: Principles to guide state aid policymaking.* Denver, CO: Education Commission of the States.

National Association of State Student Grant and Aid Programs. (2017). *NASSGAP 47th annual survey report on state-sponsored student financial aid.* Albany: New York Higher Education Services Corporation.

SC Connect. (2019). Resources. Retrieved from https://scconnect.us/resources-sc/

Schultz, T. W. (1961). Investment in human capital. *The American Economic Review, 51*, 1-17. Retrieved from https://www.jstor.org/stable/1813848

Scott-Clayton, J. (2011). On money and motivation: A quasi-experimental analysis of financial incentives for college achievement. *The Journal of Human Resources, 46*, 614-646. doi:10.3368/jhr.46.3.614

Singell Jr., L. D. (2004). Come and stay a while: Does financial aid effect retention conditioned on enrollment at a large public university? *Economics of Education Review, 23*, 459-471. doi:10.1016/j.econedurev.2003.10.006

Sjoquist, D. L., & Winters, J. V. (2015). State merit-based financial aid programs and college attainment. *Journal of Regional Science, 55*, 364-390. doi:10.1111/jors.12161

South Carolina Commission of Higher Education (SCCHE). (2018a). 2018-2019 CHE data submission dates. Retrieved from http://www.che.sc.gov/CHE_Docs/finance/chemis/CHEData CollectionSchedule2018_2019.pdf

South Carolina Commission of Higher Education (SCCHE). (2018b). CHEMIS data dictionary. Retrieved from http://www.che.sc.gov/CHE_Docs/finance/chemis/CHEMIS%20DATA%20 DICTIONARY.pdf

South Carolina Commission of Higher Education (SCCHE). (2018c). Enrollment statistics: Ten-year enrollment analysis. Retrieved from https://info.che.sc.gov/bi/v1/disp?rui=hh&b _action=xts.run&m=portal/cc.xts&gohome=

South Carolina Commission of Higher Education (SCCHE). (2019a). LIFE & HOPE scholarship brochure. Retrieved from https://www.che.sc.gov/CHE_Docs/studentservices/LIFE_Hope_Brochure.pdf

South Carolina Commission of Higher Education (SCCHE). (2019b). Palmetto fellows scholarship brochure. Retrieved from https://www.che.sc.gov/CHE_Docs/studentservices/palmetto_fellows_brochure.pdf

South Carolina Commission of Higher Education (SCCHE). (2019c). Ten-year enrollment analysis. Retrieved from https://info.che.sc.gov/reports/cgibin/cognosisapi.dll?rui=hh&b_ action=xts.run&m=portal/cc.xts&m_portlet=/connection/portlet:path:storeID(%22i20FD 91E9EBCD4BFA87D9E2F913B4AA05%22)

South Carolina Department of Revenue. (2013). SC Information Letter #12-19 (Revised). Retrieved from https://dor.sc.gov/resources-site/lawandpolicy/Advisory%20Opinions/IL12-19.pdf#search=information%20letter%20%2312%2D19

South Carolina Education Lottery. (2018). Education wins: Where the money goes. Retrieved from http://www.sceducationlottery.com/educationwins/money.aspx

Stanley, R. E., & French, P. E. (2009). Evaluating increased enrollment levels in insitutions of higher education: A look at merit-based scholarship programs. *Public Administration Quarterly, 33*, 4-36. Retrieved from https://www.jstor.org/stable/41219970

Statistical Atlas. (2018). Household income in South Carolina (State). Retrieved from https://statisticalatlas.com/state/South-Carolina/Household-Income#figure/median-household-income-by-race

Tinto, V. (2010). From theory to action: Exploring the institutional conditions for student retention. In J. C. Smart (Ed.), *Higher Education: Handbook of Theory and Research* (Vol. 25, pp. 51-89). Dordrecht, The Netherlands: Springer.

Titus, M. A. (2006). No college student left behind: The influence of financial aspects of a state's higher education policy on college completion. *The Review of Higher Education, 29*, 293-317. doi:10.1353/rhe.2006.0018

Toutkoushian, R. K., & Paulsen, M. B. (2016). *Economics of higher education: Background, concepts, and applications* (1st ed.). Dordrecht, The Netherlands: Springer.

Toutkoushian, R. K., & Shafiq, M. N. (2010). A conceptual analysis of state support for higher education: Appropriations versus need-based financial aid. *Research in Higher Education, 51*, 40-64. doi:10.1007/s11162-009-9148-5

U.S. Census. (2018). QuickFacts: South Carolina; United States. Retrieved from https://www.census.gov/quickfacts/fact/table/SC,US/PST045218

UCLA Statistical Consulting Group. (2019). FAQ: How are the likelihood ratio, Wald, and LaGrange multiplier (score) tests different and/or similar? Retrieved from https://stats.idre.ucla.edu/other/mult-pkg/faq/general/faqhow-are-the-likelihood-ratio-wald-and-lagrange-multiplier-score-tests-different-andor-similar/

University of South Carolina (USC). (n.d.a). LIFE renewal requirements. Retrieved from https://www.sc.edu/about/offices_and_divisions/financial_aid/scholarships/scholarships_for_sc_residents/life_scholarship/renewal_requirements/index.php

University of South Carolina (USC). (n.d.b). Palmetto Fellows renewal requirements. Retrieved from https://www.sc.edu/about/offices_and_divisions/financial_aid/scholarships/scholarships_for_sc_residents/palmetto_fellows/renewal_requirements/index.php

Zhang, L., & Ness, E. C. (2010). Does merit-based aid stem brain drain? *Educational Evaluation and Policy Analysis, 32*, 143-165. doi:10.3102/0162373709359683