STATE FINANCIAL AID POLICY AND COLLEGE

CHOICE: THE EFFECTS OF PUBLIC HIGH SCHOOL

CHARACTERISTICS ON PARTICIPATION RATES IN

OKLAHOMA'S PROMISE

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ii

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Abstract: Contemporary models of college choice incorporate contextual factors beyond the individual that shapes college-going attitudes and opportunities for students. One important context at the policy level is the rise of state merit aid programs that constitutes a significant shift in public policy related to college choice. Despite the popularity of these programs, disparities with respect to college access and opportunity continue to exist along racial and socioeconomic lines at the national level and in states such as Oklahoma. The purpose of this study was to determine whether high school factors affected participation rates in Oklahoma's Promise, a state hybrid-aid program that incorporates both merit and need-based eligibility criteria. The research design utilized school-level data from public high schools in the state of Oklahoma from 2004 to 2013. Participation rates were measured as percentages by high school and examined program participation, program completion, and postsecondary choice outcomes. High school factors included the racial, socioeconomic, and academic attributes of the student population for each school and other control variables related to parental engagement, high school staff resources, and college-going rates. Fractional response models evaluated the data with a fixed effects panel approach and also models for individual years. The demographic characteristics of the student population produced mixed results while college-related factors such as the average ACT score and college-going rates were positively associated with higher participation rates. High school resources, measured as the ratio of high school staff to students, were negatively associated with participation rates. The findings suggest that attributes at the high school level can mediate participation rates in Oklahoma's Promise and that policymakers and practitioners should consider how factors at public high schools can affect college choice and related public policy programs.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Government programs to help students afford higher education through direct subsidies gained immense popularity after World War II and continue to this day as a mainstay of higher education finance. Recent iterations of public policy to make higher education more affordable for college students include state initiatives such as the Tennessee Promise program that offers free tuition at community colleges for students residing in the state and the call from President Obama to develop a national model based on the success of Tennessee's program.

Other important policy developments that grew in popularity during the 1990s included the emergence of state financial aid programs that incorporated student merit as a way to encourage students to attend college in their home states. The availability of financial aid through policy action is only one factor that can influence the decisions that students make regarding participation in higher education. Other research has examined the complexity of student decision-making and various factors that can influence the process that vary from the high schools that students attend to the policy environment and availability of programs to promote participation. An important thread that deserves further attention is the relationship between these factors and how they affect student decisions. This brief chapter will identify the significance of this thread in the literature on college choice, the research design and methodology of this study, a glossary of terms associated with this study, the study's limitations, and the potential significance of this research.

Statement of the Problem

Research on student college choice suggests that students make individual decisions about pursuing various options within higher education but external contextual factors can influence and constrain individual student actions (Perna, 2006a). These factors vary from parental influences, the student's high school and community settings, the college and university landscape, as well as larger social, economic, and political factors (Perna, 2006a). At the broader level, the public policy environment exists as an important setting where both the federal government and individual states utilize a variety of policy tools to encourage student participation in higher education (Perna, Rowan-Kenyon, Bell, Thomas, & Li, 2008; Perna & Titus, 2004). One type of public policy, state merit aid programs, awards financial aid to students based on academic performance in high school and standardized tests. Merit aid programs gained popularity after Georgia's legislature established the HOPE scholarship program in 1992 and demonstrated some success at targeted policy outcomes such as increasing student access to higher education and encouraging more students to attend an in-state institution (Toutkoushian & Hillman, 2012; Zhang, Hu, & Sensenig, 2013). Presently, 32 states administer financial aid programs based on various forms of student merit. In 2013, the National Association of State Student Grant and Aid Programs (NASSGAP) estimated that states awarded $3.9 billion toward non-need aid programs (NASSGAP, 2013).

Despite their widespread use, long-standing concerns related to college choice and access exist that state merit aid programs have not resolved. Significant disparities at the national level related to student college choice remain among students from historically disadvantaged groups that include students of color and students from lower socioeconomic backgrounds (Hurtado, Inkelas, Briggs, & Rhee, 1997; Kimura-Walsh, Yamamura, Griffin, & Allen, 2008; Lee, Almonte, & Youn, 2012; O'Connor, Hammack, & Scott, 2010; Perna, 2006b; St. John, Paulson, & Carter, 2005). A 2015 report from the National Student Clearinghouse found postsecondary participation rates among higher income high schools, particularly those with low minority

populations, ranged from 64% to 72%, compared to lower income high schools with high minority populations that ranged from 53% to 55% (National Student Clearinghouse, 2015). In Oklahoma, support for programs such as Oklahoma's Promise (OK Promise), a state financial aid program with an income limit of $50,000 that is comparable to the state's median family income of $56,000, suggest that participation rates should be higher than the 27% of high school seniors who actually enrolled in the program for the 2012 graduating class (ORSHE, n.d.; ORSHE, 2014). Discrepancies such as this suggest that wider systemic issues exist regarding how public policy can address participation gaps in college access and choice. For example, research on the outcomes of state programs conclude that merit-based initiatives largely benefit White middle-class students and do not diminish gaps among racial and socioeconomic differences (Cornwell & Mustard, 2004; Farrell, 2014; Ness & Tucker, 2008).

One potential explanation for disparities among student outcomes is the effect of other environmental factors beyond individual student circumstances that influence college choice. Models of student college choice have sought to determine how student decisions about attending college are products of their environment. For example, Perna's (2006a) model of student college choice noted the dynamic nature across various levels that influence individual student behavior. A relationship exists between the larger policy environment and the local high school and community context in a way that policy can and should affect the outcomes at the high school level. However, other scholars suggest that present models still give too much credit to earlier frameworks of college choice that frame college choice as an individual choice and ignore larger effects by both colleges and public policy that shapes college-going opportunities (Rhoades, 2014). In the policy arena, efforts at the national level such as the Spellings Commission Report have highlighted the need for better coordination and alignment between K-12 and higher education policy (Spellings Commission, 2006).

At the state policy level, examining how the public policy aims and goals of state merit aid programs align with efforts at the high school level to affect student college choice could

provide additional attention to this particular topic. Some previous research found that high

school settings, particularly the role of high school counselors, are significant in the college

choice process (Engberg & Wolniak, 2010; Johnson, 2008; McDonough, 1997; Roderick, Coca,

& Nagaoka, 2011). Other research concluded that counselor encouragement of merit aid

programs can often be constrained by the resources available at the high school level (Hargis,

2007).

Statement of Purpose

This study sought to bridge the existing research on merit aid programs and college

choice by examining the role of high schools and public policy programs designed to promote

postsecondary opportunities. The purpose of this study was to examine whether contextual

factors at the high school level predicted participation rates and postsecondary attendance rates

associated with the OK Promise program in the state of Oklahoma. This study addressed the

following research questions:

1. Do contextual factors in Oklahoma public high schools, including school demographic

    characteristics, the staff to student ratio, the level of parental involvement, the college-

    going rate, and average ACT scores, affect the percentage of students by high school that

    participated in Oklahoma's Promise, a state hybrid aid program?

2. Do contextual factors in Oklahoma public high schools, including school demographic

    characteristics, the staff to student ratio, the level of parental involvement, the college-

    going rate, and average ACT scores, affect the completion percentage of students by high

    school enrolled in Oklahoma's Promise?

3. Do contextual factors in Oklahoma public high schools, including school demographic

    characteristics, the staff to student ratio, the level of parental involvement, the college-

    going rate, and average ACT scores, affect the percentage of students that completed

    Oklahoma's Promise and attended a public research university after graduation?

Procedures

This study examined whether the characteristics of public high schools in the state of Oklahoma influenced aggregate student participation rates in the OK Promise program. This state financial aid program awards in-state tuition to students who sign up during the 8th, 9th, or 10th grades, demonstrate financial need, and maintain good grades and behavior. This quantitative study utilized student participation data by high school in the OK Promise program and various high school characteristics and resources from 2004 to 2013. The Oklahoma State Regents for Higher Education (OSRHE), a state-level governing board that administers the OK Promise program, provided data by high school regarding enrollment in the program, completion of the program, and postsecondary choices after graduation for OK Promise participants. School-level demographic and resource data was obtained from the Oklahoma Department of Education's Office of Educational Quality and Accountability (OEQA).

The study utilized fixed effects regression models to analyze the data. Fixed effect models are appropriate when examining longitudinal data in order to explain variation within an observation over time (Allison, 2009). The timeframe utilized in the study coincided after a significant change in OK Promise state policy that increased the income limit of participating families from $24,000 to $50,000 which occurred in 2001-2002. The use of a fixed effect model can help account for variation over time after these program changes. A full description of the research design and methodology is included in Chapter III.

Several factors about Oklahoma and the OK Promise program provided a useful framework for studying the relationship between high school factors and state merit aid programs. The state of Oklahoma is largely a rural state whose financial support of K-12 and higher education lags behind the national average (NEA, 2015). Despite this trend, OK Promise remains a popular state program with over 139,000 students who enrolled in the program and over 78,000 students who completed the eligibility requirements since its creation in 1992 (ORSHE, 2014). In 2012, participation in OK Promise represented a little over 1/4 of the total high school graduates

in the state, and of those that signed up for the program, roughly 2/3 actually completed the program requirements (ORSHE, n.d.; ORSHE, 2014). Despite low participation rates, research on OK Promise found that participation in the program can help with college persistence (Mendoza & Mendez, 2013). The availability of longitudinal data at the high school level in Oklahoma obtained for this study allowed for a robust analysis to compare outcomes on a number of factors.

Definition of Key Terms

Terms and phrases used in both the college choice and merit aid literatures are used interchangeably in many settings. To clarify the meaning and intent of the key concepts of this study, the following terms are defined.

Student College Choice – College choice refers to the process by which individual students determine whether to pursue higher education, and if so, where they choose to attend (Bergerson, 2009). For the purposes of this study, this term incorporates both the decision-making of students explained in economic models and also the contextual factors examined in sociological models of choice.

Financial Aid – This term refers to federal or state money given to students on the basis of need and/or merit that can be used at the institution of their choice within the guidelines of the specific program. Financial aid can be used to offset the costs of higher education, including tuition and fees, room and board, or other expenses.

Public Policy - Public policy is defined as a set of formal actions taken by a government body, whether at the local, state, or federal level (Larson & Lovell, 2010).

State Merit Aid Programs – Merit aid programs are state financial aid programs where students qualify for a financial aid award that can be used in the state toward the cost of their education expenses. Merit aid programs utilize academic benchmarks to award aid, often based on high school grades or standardized test scores (Cohen-Vogel, Ingle, Levin, & Spence, 2008).

State Hybrid Aid Programs – Hybrid aid programs are state financial aid programs where

      students must meet both merit and need requirements (Cohen-Vogel, Ingle, Levin, &

      Spence, 2008; Mendoza & Mendez, 2013). For the purposes of this study, OK Promise is

      considered a hybrid program because it has a set income limit for participants and also

      requires a number of different academic benchmarks beyond high school graduation to be

      met in order to receive the benefits of the program.

Eligibility Requirements – This term refers to the various stipulations associated with merit aid

      programs that students must either fulfill in order to qualify initially for the state merit aid

      or must meet while enrolled in college to maintain those benefits (Ness, 2008; Ness &

      Tucker, 2009).

Outmigration - This term refers to the process where students residing in one state choose to

      attend college in another state. The body of research on merit aid programs has identified

      discouraging outmigration as an important policy goal (Orsuwen & Heck, 2009;

      Toutkoushian &Hillman, 2012).

Oklahoma's Promise Enrollment and Completion – These terms signify different levels of

      participation in the OK Promise program. In the setting of this study, enrollment

      signifies students that initially signed up for OK Promise by the end of their sophomore

      year and were still enrolled in the program during their senior year. Completion signifies

      students who fulfilled all eligibility requirements for the program in order to receive the

      scholarship at an Oklahoma postsecondary institution.

Significance of the Study

      The timing of this study was relevant because the research comes at a time when a

number of different states utilize merit aid programs. A significant body of research has started

to unpack both the complexity of these policies and their intended and unintended outcomes.

Conducting this study can help contribute to this existing literature, the theoretical considerations

that drive them, and the practical considerations to implement and support them.   First, this study

can contribute to the literature on both college choice and merit aid programs. Little research within the merit aid literature explores the role that high schools play in affecting student participation. In fact, much of the attention on merit aid programs focuses on student outcomes by examining individual characteristics rather than nesting these results within a broader context. This study can also provide another avenue to test sociological and integrated models that consider both individual and larger contextual factors. From a policy research perspective, this study can contribute by examining whether policy action in one area such as higher education affects the actions in another, in this case the K-12 policy arena.

This study can also further inform theoretical models of student college choice. Perna's (2006a) conceptual model of student college choice served as the primary model used in this study. Much of the research utilizing this model focuses on how contextual factors such as high schools and community, the higher education community, and the larger social, political, and economic environment affect student behavior. However, one component of Perna's model not examined is the alignment between these contextual layers and how the relationship among layers affects student college choice. This study sought to understand the relationship between different layers of the model and its overall impact of the outcomes of student college choice as a way to test the entire conceptual framework.

Finally, this study can inform practice at the state policy level and both K-12 and higher education practitioners. Funding for higher education from government sources such as federal and state aid are increasingly relevant and important components of the college decision-making process and stakeholders at all levels are motivated and invested in the success of this financial aid. Both higher education institutions and high schools want to motivate students to pursue higher education. Further examination of this issue could address considerations associated with the alignment between K-12 and higher education. This study could help ascertain whether high schools, particularly in a state with limited resources, can influence the college choice process for many of their students.

Limitations of the Study

There were a number of limitations for this study. First, the scope was limited to the state of Oklahoma. Although the available data and contextual factors made Oklahoma an interesting case to study, this study did not examine other states that might have different demographic characteristics, policy structures and programs, and iterations of financial aid programs that could make generalizing the results troublesome. Additionally, OK Promise represented a unique public policy program to study due to its eligibility requirements where students have to apply to the program in junior high, its financial need component, and its narrow participation rates among Oklahoma students. Another limitation was that this study examined data from 2004 to 2013 that narrowed the scope of analysis to that ten-year period. Consequently this study cannot generalize findings regarding the OK Promise program throughout its entire history.

Organization of the Study

This study provided an opportunity to examine whether high school characteristics and resources aligned with the goals of public policy programs such as merit aid programs to affect student participation in higher education. Both the existing literature on student college choice and state merit aid programs demonstrated the necessity of better ways to determine the complexity of the choice process and the effect of policy interventions such as financial aid programs. The results of this study are organized in the following chapters. Chapter II reviews the critical scholarship related to college choice and the public policy literature on merit aid programs. Chapter III identifies the research design and methodology utilized in this study in greater detail, including the context of the study. Chapter IV describes the results from the data analysis conducted in the study. Chapter V presents a broader discussion of the results from the data analysis, the implications of the results on theory, research and practice, and recommendations for policymakers, practitioners, and scholars.

CHAPTER II

LITERATURE REVIEW

Research on the topics of higher education public policy and student college choice
represents two distinct yet interrelated bodies of work. This chapter presents an exhaustive
review of the current literature in order to understand the dynamics of these corpora and to define
critical elements. First, the chapter will discuss the search process used to identify and analyze
the literature. Second, the chapter will explore the college choice literature, including the
important conceptual models that are widely used in the research, especially Perna (2006a)'s
conceptual model of student college choice and the contemporary research within the field.
Third, the chapter will examine the empirical research in college choice. Fourth, the chapter will
review the public policy literature as it relates to college access and choice, specifically the
dynamic nature of the policy process at the national and state level and key theories that
conceptualize the policy process. Fifth, the chapter will narrow its focus to state merit aid
programs, specifically their development and effect on individual student behavior, and their
influence on larger components at the high school, college, and state level.

The Search Process

Research for this literature review was conducted using a comprehensive strategy to
identify relevant scholarship using online searches. Databases utilized included Oklahoma State
University's Big Orange Search System (BOSS), Academic Search Premier, JSTOR, ERIC, and
Google Scholar. Search terms used included, *state merit, aid, college choice, high schools, state*

public policy, state financial aid, and policy outcomes and other related terms over the course of several months. Reference lists for key journal articles and other scholarly works were also cross-referenced to ensure that all appropriate scholarship was included in this review. Individual issues from the past five years of *The Journal of Higher Education, Research in Higher Education*, and *The Review of Higher Education* were reviewed to ensure that contemporary literature was included.

Conceptual Models of College Choice

The literature on college choice is complex and examines a number of factors that influence not only the decision to attend college but also the decision to attend a specific institution. Unpacking the relevant and current research on college choice can shed light on the dynamics of the process and how public policy can influence choice. This section will examine three critical threads in the college choice literature. First, it will examine three contemporary theoretical frameworks associated with college choice: economic, sociological, and integrated models and will discuss in some detail some of the specific models that are widely used. Second, it will look at specific research on college choice and its effect on the current state of college participation scholarship.

Economic Models

Economic models of college choice argue that students make decisions regarding the costs of attending college and weigh options regarding what benefit they will receive from attending (Bergerson, 2009; Hossler, Schmit, & Vesper, 1999). These models also assume that students utilize near-perfect information about the various factors related to the choice process and act in a rational manner to make a decision. The literature on economic models also focuses particularly on college costs and financial aid while examining individual attributes of students, such as parental income and student academic ability (Bergerson, 2009). Earlier models such as Kotler and Fox (1985) framed college choice as a series of choices in which students weigh

11

information regarding costs and risks associated with attending college to make an informed decision (Hossler, Schmit, & Vesper, 1999).

Despite their earlier widespread use in the topic of college choice, economic models received widespread criticism. For example, Hossler, Schmit, and Vesper (1999) and Tierney and Venegas (2009) noted that economic models that utilize rationality as a basis suggests that there is a logical, sequential order to the choice process. Realistically, students arrive at various stages at different points in their lives. In many cases, economic models typically assumed that students are working with perfect information when often this is not true (Hossler, Schmit, & Vesper, 1999). Additionally, many economic models utilized variables that are sociological in nature, such as parental income and socioeconomic status (Hossler, Schmit, & Vesper, 1999). The use of these sociological factors presented a significant problem when trying to consider only economic factors to determine choice because they also affected the decision-making process.

Sociological Models

Sociological models provide an alternative lens to understanding college choice. Many of the sociological models emphasize status attainment approaches that seek to understand how characteristics such as class, race, and family expectations shape the choice process (Bergerson, 2009; Hossler, Schmit, & Vesper, 1999). For example, Hossler and Gallagher's (1987) three-stage model portrays college choice as a linear process that typically begins in junior high. The predisposition stage reflects student attitudes and beliefs about whether to attend college that are affected by a variety of both individual factors, such as socioeconomic status and academic achievement, and external factors, such as parental involvement and expectations and involvement regarding college choice (Bergerson, 2009; Hossler, Schmit, & Vesper, 1999; Cabrera & La Nasa, 2005).

The search stage begins when students start to identify key characteristics of desirable college options and represents increased contact between the student and potential colleges. During this stage students begin engaging in activities associated with attending college,

including taking standardized tests such as the ACT or SAT, visiting college campuses, and attending workshops about college. Similar to the predisposition stage, parents significantly influence the process, particularly dealing with issues such as financial aid and the costs to attend college (Bergerson, 2009; Hossler, Schmit, & Vesper, 1999).

The final stage, choice, refers to students finalizing their college plans by selecting an institution and enrolling. Similar to the earlier stage, certain individual factors, such as academic achievement, play a role in the type of institution selected. Additionally, parental influences are still important, although not as significant as in earlier stages. Institutional characteristics such as location, degree programs, and other attributes become prominent during the choice stage (Bergerson, 2009). During this stage, the availability of information and the ability of students to synthesize it - regarding institutional characteristics, financial aid, and associated costs - become more prominent as students begin to weigh their options regarding choice. To gather information regarding college opportunities, students engage in different passive, active, or interactive strategies (Bergerson, 2009; Hossler, Schmit, & Vesper, 1999). Socioeconomic status can also play a role in obtaining information about college during this stage as students from higher socioeconomic backgrounds benefit from better access to resources to inform their choices (McDonough, 1997; Bergerson, 2009).

Many sociological approaches in the college choice literature utilize Bourdieu's (1977) concepts of capital. According to Bourdieu, three types of capital exist - economic, social, and cultural. Economic capital refers to financial resources while cultural capital includes benefits from exposure to increased educational and other opportunities and social capital reflects the individual's resources derived from personal relationships and connections (Bourdieu, 1986; Bergerson, 2009; Hossler, Schmit, & Vesper, 1999). Within this framework, Bourdieu identifies a separate concept known as habitus. He described habitus as a "feel for … the social game" (Bourdieu, 1990, p. 63) that is immersed in the experiences within a specific social group. In this case, the social game refers to how individuals amass the different types of capital. In her

application of habitus to the college choice process, McDonough (1997) notes that habitus could shape the frame of reference for students and their families who aspire to attend college.

Capital and habitus are important constructs within the college choice framework for several reasons. First, they provide a structural framework to examine factors beyond a student's control, such as family wealth and social class, and how these constructs can influence the college choice process. Decisions about whether and where to attend college are constrained and influenced not only by the resources available to students but also by their perceptions of these resources. Limitations to an individual student's acquisition of capital, and in turn a more limited habitus, can also determine the level of information available to a student regarding the process (Perna, 2006b). McDonough's (1997) examination of the relationship between students and the resources of the high school that they attended found that the availability of family resources coupled with attending a private high school increased the level of information about attending college and also the available resources to attend a specific institution. She also determined that efforts at different schools with a range of financial and human resources affected how they educated students about the college choice process. The important contribution of the capital and habitus constructs is that they highlight the complexity of the college choice process and the influence of a multitude of factors. However, other models of college choice use different approaches to provide a more comprehensive exploration of college choice.

Integrated Models

Contemporary research on college choice utilizes integrated models that combine the individual role of weighting cost and finances from the economic models with the larger socioeconomic frameworks to examine external factors such as family resources and community context. In one such model, St. John and Paulson (1996) argue that many of the external factors that influence student college choice persist throughout students' time in college (Paulson & St. John, 2002). As a result, a nexus exists between how students initially perceive costs and other financial factors with subsequent perceptions when deciding whether to persist in college.

14

Paulson and St. John's nexus model contains many parallels with other sociological approaches to college choice that have utilized habitus and how it both influences and constrains student behavior. Their research on the nexus model also identifies that these influences on student situations can often lead to different responses based on students' perceptions of how to finance their college education.

Other models that build upon the nexus model have more readily identified the role of public policy in the college choice process. St. John (2003) developed a conceptual model that linked financial aid policy to the student lifecycle that began with educational achievement at the K-12 level through access and choice into higher education and success while in college. In the model, St. John laid out several key assumptions regarding the role of public policy to influence college choice. He argued that policy should consider social justice when using financial aid in order to promote access and equity among different socioeconomic and ethnic groups and efficacy to taxpayers. St. John identified the importance of considering economic theories of college choice but also noted the influence of family and larger contexts on individual choices. He also argued that one of the challenges with public policy and college choice has been the emerging tension at the secondary level regarding efforts to promote quality education through measurable outcomes that has contrasted with historical efforts at determining preparation at the secondary level. Finally, although research could influence policy formation, the role of politics has largely dictated many of the major federal and state decisions about the direction of financial aid strategies since their inception. St. John's conceptual model also identified the interconnectedness of public policy with the educational process and that educational policy reform at the K-12 level could impact outcomes such as academic preparation that would also affect higher education.

Perna's Model of College Choice

Limitations associated with both sociological and economic models prompted other

scholars to develop more complex, integrated models of college choice. Perna (2006a) offers

another prominent model suggesting that the student's individual decision-making process (using

economic theory as a basis) should be nested within a hierarchical sociological framework of

habitus based on different contexts at the school and community, higher education, and social,

economic, and policy levels. At the individual level, Perna explains that student decision-making

relied upon on typical economic models of college choice, including consideration of the

demands for higher education coupled with the costs and benefits associated with attendance and

graduation. Student factors such as demographics, parental influences and expectations, as well

as cultural and social capital, all shape how students understand and value the economic

components involved in the college choice process (Perna, 2006a). Figure 2.1 illustrates Perna's

conceptual model.
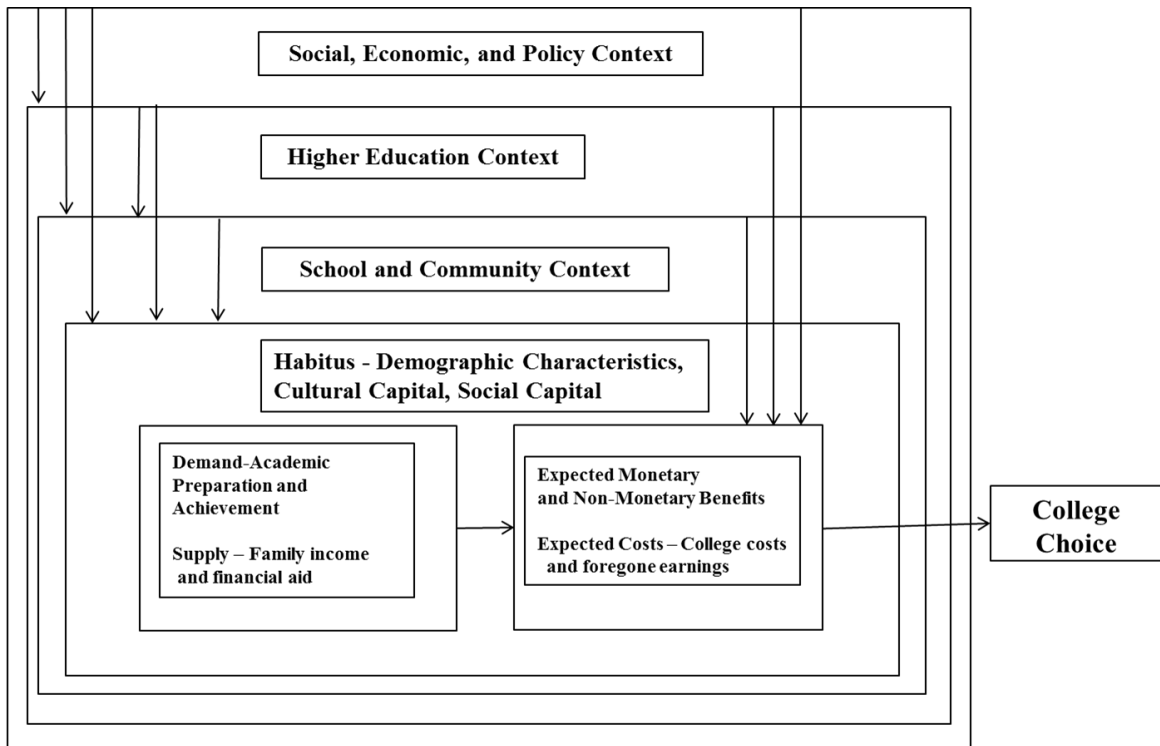
Figure 2.1 Perna's Conceptual Model of College Choice. Adapted from 'Studying College Access and Choice: A Proposed Conceptual Model", by L.W. Perna, 2006, *Higher Education: Handbook of Theory and Research, XXI,* p. 117. Copyright 2005 by Springer.

Perna's (2006a) model also attributes factors beyond the student and noted how each of these layers affected individual student behavior while also exerting influence on the other layers. The first layer includes factors at the school and community level and considered what resources and information were available to assist students. The next layer examines the higher education context, particularly the role of institutions to recruit students and institutional characteristics such as location, size, degrees offered, and other appealing attributes. Finally, the social, economic, and policy contexts include factors that influence the demand and value of higher education, demographic trends, and the enactment of public policy that could influence college choice. At the highest level, these larger social, economic, and policy considerations constrain and enable student college choice. For example, Perna notes that the development of a new need-based aid program at the policy level could influence students' decisions by providing financial resources to attend college.

Perna's (2006a) model also explores the relationship among different contexts and whether these relationships were hierarchical. For example, higher education institutions could influence school and community contexts about college opportunities through recruitment, the availability of institutional financial aid, and the relationships between college and high school personnel. Both the high school and community context and the higher education context also fall within larger social, economic, and political conditions, such as state and federal policies, that influence both colleges and high schools. All of these examples highlight the dynamic nature of Perna's model that individual factors and larger contextual factors affect individual decision-making.

Perna's (2006a) model can guide the trajectory of the college choice scholarship in a number of ways. First, similar to St. John's (2003) model, Perna's model recognizes the value of economic decision-making at the individual level but framed this within broader contexts that range from family influences to larger social forces. Second, this model identifies the importance of the relationships among the tiers of contextual layers at the local, college, and policy levels.

Third, Perna also notes that this conceptual framework should encourage further research on effects beyond individual decision-making, from the intermediate effects of college choice on academic preparation in high school to the development and outcomes of public policy programs designed to promote student opportunities in higher education.

Although Perna's (2006a) model provides a cohesive framework to understand how various factors affect college choice, criticisms of contemporary college choice models also exist. Rhoades (2014) noted that existing trends in college choice, such as Perna's model and other important threads in higher education research, discount the role of larger social forces that constrain individual perspectives and choices. He argued that current models of college choice place too much emphasis on individual decision making to the exclusion of other forces that shape opportunities for students. Some of these contexts include the role of family in the decision-making process, the availability of college in physical proximity to the student, and the efforts made by institutions to market themselves to prospective students (Rhoades, 2014).

Despite these criticisms, subsequent studies have applied Perna's model to a number of different settings, including how students obtain knowledge about the college-going process (Bell, Rowan-Kenyon, & Perna, 2009), the role of high school counselors (McKillip, Rawls, & Barry, 2012), specific information about college prices and financial aid (Perna, 2006b), career development planning (Rowan-Kenyon, Perna, & Swan, 2011), the relationship between school context and student understanding of financing college through the use of loans (Perna, 2008), and the development of a typology of federal and state programs designed to promote college access (Perna, Rowan-Kenyon, Bell, Thomas, & Li, 2008). The cohesive nature of Perna's model provides opportunities to examine the linkages that influence individual students while also acknowledging the importance of the individual and their family in the college choice process.

Empirical Research on College Choice

An integrated approach such as Perna's (2006a) model offers an important framework to understand current research on the topic of college choice. For example, public policy, at both the

state and federal level, affects individual students, the high schools that they attend, and the colleges they are considering. The nesting of contextual factors within larger social and economic frameworks also suggests that policy directed at influencing individual choice can and should influence actions at the secondary and postsecondary level. The following sections examine recent scholarship on college choice that addresses issues related to the constructs of Perna's model.

The Individual Context

Contemporary research on college choice and student background characteristics has centered on the effects of social class and racial/ethnic identity on the decision-making of students. Paulson and St. John (2002) examined the disparate effect of social class on choice and persistence and found that students from lower income backgrounds were more cost conscious about selecting a college, including considering institutions with lower tuition, the availability of student aid, low living costs, or location in close proximity to their job. Paulson and St. John also found that social class disproportionally affected women and students of color. Lee, Almonte, and Youn (2012) argued that contextual factors such as lower socioeconomic status and attending an urban high school correlated negatively with the likelihood that an individual would attend college. Tierney and Venegas (2009) examined the role of early commitment programs designed to encourage students to consider college at an earlier age and noted that students from lower socioeconomic status and minority status can often self-select themselves out of going to college due to perceptions about affordability to pay for college.

The disparate outcomes of student college choice across racial and ethnic groups are also well-documented. Hurtado, Inkelas, Briggs, and Rhee (1997) utilized data from two national longitudinal surveys that captured the college selection process among students from different racial and ethnic backgrounds. They found a distinct relationship between the race and ethnicity of a student and the student's choice of institution and the number of institutions to which the student applied. For example, they noted that African American students had similar

expectations to attend college and apply to multiple schools as White students but were less likely to attend their first choice among institutions. Hispanic students were also the least likely to engage in the college choice process, resulting in the highest proportion of any racial group attending a community college. For Asian American students, academic ability was the main factor to determine their strategy when applying to college (Hurtado, Inkelas, Briggs, & Rhee, 1997).

One reason for discrepancies among racial groups is the level of information available to students from different racial and socioeconomic backgrounds. An important thread in the literature on college choice has centered on the information gathering and processing component of the college selection process. For example, Perna (2006b) noted that despite high participation rates for students in federal financial aid programs, many students and their families had little information about these opportunities. Other scholarship identified the challenges of information gathering and processing for different racial and ethnic groups. Kimura-Walsh, Yamamura, Griffin, and Allen (2008) determined that Hispanic female students heavily relied upon schools to disseminate information regarding the college choice process, particularly given the limited social capital resources for many of their parents. Other research found similar results regarding the limited social capital of many Hispanic families to understand the process (O'Connor, Hammack, & Scott, 2010). Pérez and McDonough (2008) explained the importance of families in the decision-making process for Hispanic students and the dynamic role of parents, particularly noting that many Hispanic parents did not have the necessary information and instead students had to rely upon extended family and community members to assist in the process.

The availability of information regarding the type of financial aid to pay for college can also factor into the college choice process. Perceptions about college loans are contingent on socioeconomic status and other factors, such as parental and school influences about the fear of going into debt to obtain a college education (Perna, 2008). Elliott and Friedline (2013) noted that African American students and lower-income families of all racial/ethnic groups were much

more likely to take out loans than other students. They also found that the proportion of African

American and Hispanic families who can contribute significantly to paying for college, if at all,

was much less than White and Asian families. Other research noted that the larger shift toward

using student loans to finance attending college negatively affected some groups such as African

Americans that are particularly sensitive to college costs (St. John, Paulson, & Carter, 2005). In a

longitudinal qualitative study that examined low-income and minority students through the

college choice process, Cox (2016) identified several constraints that influenced students'

expectations and realities about attending college. These included complex family situations at

home with students moving frequently and often living with extended family or friends,

difficulties completing the FAFSA, and making decisions regarding financing their college

education.

Family involvement has also shaped the college selection process. Parental participation

has grown in the past few decades, due in part to their involvement in financial aid such as

supplying tax information for the FAFSA and their assistance helping students compare costs

across institutions (Lange & Stone, 2001). Bers and Galowich (2002) argued that the role of

parents in the college search process is increasingly important as parents rely upon information

shared by colleges, particularly parents whose children are considering community colleges.

Elliott and Friedline (2013) found that parental expectations and willingness to pay for college

also influenced their student views. These signals from parents indicated expectations about

taking on the financial burden of paying for college and affected whether students were likely to

attend college in the situations where they had to pay directly or take loans to cover the costs of

attendance. Kiyama and Harper (2015) also stressed that the literature on college choice has

identified the role of parents and families, particularly from underrepresented backgrounds, to

instill upon students the desire to attend college that can lead to higher levels of college

enrollment.

The High School and Community Context

Another thread of the research on college choice centers on the role of high school contextual factors in the college selection process. The composition of students in attendance at a specific high school in turn affects the academic quality, socioeconomic status, and ethnic composition of a school and the available resources to affect student participation in higher education (Johnson, 2008; Engberg & Wolniak, 2010). The type of resources available at the high school level can also vary considerably, with programmatic resources, such as offering advanced placement or other challenging coursework, having the most influence on student attitudes about attending college (Klugman, 2012). Some research suggests that other attributes such as school size can play a role in perceptions regarding access to college and that the smaller school size can prompt better relationships between students and high school faculty and staff, closer collaboration among high school staff to create a college-going culture and enhanced student participation in various activities (Farmer-Hinton & Holland, 2008).

External factors can also influence how high schools operate to help with student college success. McDonough (1997) applied Bourdieu's concept of habitus to high schools and how it affected high school counselors' perceptions of their role to encourage and support college choice. McDonough identified that school characteristics shaped counselors' worldviews of their specific high school, including the background and demographics of the students they served, the resources available to counselors, and the mission and focus of the school itself. Similarly, Hargis (2007) determined that the setting of specific schools and available resources largely influenced the ability of high school counselors from three distinct schools in Tennessee to promote the state's merit aid program as an avenue to attend college. Other research explored how high schools can help disadvantaged students who lack the resources and/or knowledge to overcome barriers to attending college (Roderick, Coca, & Nagaoka, 2011).

School characteristics can also affect student participation in higher education. A 2013 report from the National Association of College Admission Counseling (NACAC) noted that both

the smallest and largest high schools by student population had lower college attendance rates than other schools. The same study found that schools with lower counselor-to-student ratios reported both higher overall enrollment rates and a greater percentage attending a four-year institution (NACAC, 2013). This report echoed other research that concluded that while high school characteristics such as institutional type and size can affect college choice, counselors can overcome large caseloads to facilitate a college-going culture (Engberg & Gilbert, 2014; McKillip, Rawls, & Barry, 2012). Other scholarship found that larger graduating class sizes could influence student motivation to view college as a means toward larger personal goals (Horyna & Bonds-Raacke, 2012). However, perceptions about the value of a college education can vary greatly between high school counselors and families that can exacerbate efforts to promote college access at the high school level (McDonough & Calderone, 2006). For example, some research indicated that most efforts by high schools to engage students in the college choice process occurred in the 11th or 12th grade but substantial information gaps about college persisted at that point in the college search process (Bell, Rowan-Kenyon, & Perna, 2009).

The changing role of high school counselors has also influenced the college selection process. A 2012 College Board national survey of school counselors identified several key roles that varied from personal counseling and scheduling to career and college counseling, with 94% of all high school counselors indicating college counseling as a responsibility. The same study found that 74% of counselors also reported academic testing as a primary responsibility (The College Board, 2012). In contrast to this, the 2013 NACAC report found significant differences in the amount of time high school counselors spent engaging students about college, ranging from 23% of their time for public school counselors to 53% of their time for private school counselors (NACAC, 2013).

Other studies sought to understand the role of counselors in the college choice process. Bryan, Holcomb-McCoy, Moore-Thomas, and Day-Vines (2009) examined a longitudinal national sample of high school seniors to understand key differences among students who visited

counselors for information about college. They found that females and African American students were more likely to visit counselors for assistance about college. Interestingly, the authors also determined that the size of the school combined with the socioeconomic makeup of its student population made a difference, with students at smaller schools with higher levels of socioeconomic status more likely to utilize counselor resources. Additionally, students whose parents contacted counselors were also more likely to contact the counselors themselves (Bryan, Holcomb-McCoy, Moore-Thomas, & Day-Vines, 2009). In a follow-up study using the same data, Bryan, Moore-Thomas, Day-Vines, and Holcomb-McCoy (2011) suggested that the number of counselors in a particular school, coupled with the amount of counselor-student contact, affected students applying to multiple institutions. They suggested that high school counselors could contribute to creating a college-going culture, particularly through interactions with students earlier in high school.

Other research argued that high schools can play a role to align student ability with institutions that meet their academic profile (Hurwitz, Smith, Howell, & Pender, 2012). This concept, known as undermatching, received considerable attention in recent years, in part due to works such as Bowen, Chingas, & McPherson (2009) who identified larger systemic issues where students were choosing to attend less selective institutions despite the academic qualifications to attend more prestigious institutions. Estimates have found that as many as 40% of all students undermatch, particularly among students from lower socioeconomic backgrounds (Smith, Pender, & Howell, 2013).

Other studies examined the aggregate-level effects of the high schools that students attend on college choice and success while in college. Johnson (2008) utilized high school level data in a hierarchical linear model to determine student enrollment at a large public university and their subsequent persistence and graduation at that institution. The study determined that matriculation, persistence, and graduation rates reflected a concave curvilinear relationship with high school attributes such as SAT taking rates. The author also suggested that colleges could

utilize information based on high school indicators to assist recruitment of prospective students as well as identifying students at risk once they were in college.

The Higher Education Context

Colleges and universities also devote considerable resources to influence student decisions in the college choice process. Bergerson (2009) noted the development of a significant body of literature regarding the role of institutions in the college choice process, squarely putting institutions in the conversation about their actions. Lange and Stone (2001) observed that efforts at recruiting students to higher education from the institutional standpoint shifted considerably over the last twenty years due to increased competition. This change led to many institutions adopting an enrollment management model that consolidates areas relevant in the college choice process, such as admissions and financial aid, within the same organizational structure (Lange & Stone, 2001). A 2013 report by NACAC identified that institutions placed considerable importance on a number of strategies to engage prospective students, including hosting on-campus events, using a website, sending physical and electronic mail, working with high school counselors, and visiting with students at high schools and/or college fairs (NACAC, 2013).

Other changes at the institutional level included the emergence of marketing efforts by individual colleges. Anctil (2008) noted that institutions began concerted efforts to market themselves during the latter part of the twentieth century due to external pressures on institutions, including decreased government support, declining enrollment, and economic conditions. The emergence of for-profit higher education also created increased competition among institutions for prospective students. As a part of the college choice process, Anctil argued that perception remained an important element of influencing individual student decisions. Furthermore, the nature of competition among institutions with similar characteristics and roles in the larger society lends itself to efforts by institutions to differentiate themselves from other institutions. In turn, this led to messaging to prospective students that deviated from emphasizing the core academic mission of the institution (Anctil, 2008).

One important area of institutional effort includes institutional financial aid strategies. St. John (2001) explained the importance of financial aid on recruitment at all types of institutions. He found that financial aid can be a dealmaker for both students at higher and lower levels of resources and suggested that it was imperative that institutions balance their approach, not only for initial recruitment purposes but also for persistence. St. John also identified that institutional financial aid was critical for positively influencing persistence rates and long-term institutional revenue (St. John, 2000). Other research suggested that some institutions also capitalize on the use of financial aid in their marketing and branding strategies. For example, the University of North Carolina utilized financial aid through its Carolina Covenant program that guaranteed significant financial assistance to needy students in order to recruit students and also to highlight the institution's commitment to access (Harris & Barnes, 2011). This effort contributed to better student recruitment, including lower-income students, and better leveraging as an institution to utilize resources devoted to financial aid and access (Harris & Barnes, 2011).

Existing networks between high schools and colleges also shaped the college choice landscape over the past century. Founded in 1937, NACAC remains the largest national organization comprised of both high school counselors and college administrators to help students attend college. Scholars such as Wolniak and Engberg (2007) explored the role of feeder networks from high schools to particular colleges that provide a pipeline of new students to the institution and found that many of these relationships exist at elite colleges and private high schools that are motivated to recruit legacy students.

The Social, Economic, and Policy Context

Broader social, economic, and policy factors also shape individual student choices about attending college. Perna and Titus (2004) reviewed public policy at the state and federal level and identified four types of politics that could influence college choice. These categories included direct institutional appropriations, financial aid to students, tuition setting policies, and academic preparation programs. In their findings, they also argued that financial aid policies

were the most important influence on college choice. When looking at specific policies designed to affect student college choice, Perna, Rowan-Kenyon, Bell, Thomas, and Li (2008) developed a typology based on programs in five states and determined that states devoted various levels of resources and different strategies to help both high achieving students and students with low finances. However, they found that most state efforts directed financial aid to the student compared to other types of programs (Perna, Rowan-Kenyon, Bell, Thomas, & Li, 2008). Further examination of the role of public policy, particularly different types of financial aid and its influence on student college choice, will be explored in the next section.

Public Policy

The previous section identified models of college choice such as those of St. John (2003) and Perna (2006a) that emphasize the role of public policy on college choice. In many ways, actions by both the federal government and state governments set the tone for college choice by developing policies and programs to encourage participation in higher education. This section will discuss the larger policy environment, including the development, implementation, and structural and political dynamics of public policy related to college choice. This section will also examine the evolution of state merit aid programs, a specific type of policy action that has garnered significant attention and popularity among both policymakers and scholars over the past twenty years. Finally, this section will review the literature related to the outcomes of state merit aid programs.

Conceptualizing Public Policy

Larson and Lovell (2010) identified public policy as the "collection of policies embodied in constitutions, statutes, rules, and regulations that have been enacted by various governments at some level" (p. 3). The core parts of the public policy process draw upon three key elements and the relationships between them: the external environment (and perceptions of it), social policy activity, and government policy activity (Ripley, 2010). The external environment refers to social and economic conditions within a political division (such as a country or state) while government

policy activity reflects the process of decision-making through official action by government actors. Compounding this relationship is social policy activity where individuals participate in the process by engaging with the government in response to the external environment (Ripley, 2010).

Both the federal and state governments share the responsibilities of higher education public policy. Historically, states enjoyed primary responsibility due to the 10th amendment to the U.S. Constitution which reserves the authority for education to the states by excluding it as a federal area of authority (Gladieux, Hauptman, & Knapp, 2010; McGuinness, 2011). However, the federal government assumed a larger responsibility by providing financial aid directly to students after World War II. The passage of the G.I. Bill in 1944 allocated federal money to returning veterans to attend college as a way to integrate them back into American society. Subsequent federal support over the next two decades emphasized supporting research and recruiting students to degree programs associated with national defense during the Cold War era. In 1958, the National Defense Education Act created federal aid programs, including funding for graduate students and the National Defense Student Loan program, which later became the Perkins loan program (Freeland, 2007; Hearn, 2001).

The early federal aid programs that targeted specific student populations paved the way for broader federal support. The passage of the Higher Education Act of 1965 and its amendments in 1972 created a number of other federal aid programs, most notably the Pell Grant, the largest federal grant program. Other programs that emerged included the Supplemental Educational Opportunity Grant (SEOG), the State Student Incentive Grants (SSIG) and the federal work study program (Hearn, 2001).

Federal student loan programs also emerged during this time period. The 1972 amendments to the Higher Education Act created the Guaranteed Loan Program to utilize private student loans from banks that institutional financial aid offices managed while the federal government paid loan interest until graduation. In 1980, Congress created the Parental Loans for

Students (PLUS) programs that allowed parents and guardians to borrow money toward college expenses for their students (Hearn, 2001). The 1986 reauthorization created the Supplemental Loans to Students (SLS) program which provided unsubsidized loan options to students. In 1992, Congress consolidated the guaranteed loans into the renamed Stafford loan program (Hearn, 2001). The federal government briefly flirted with a direct lending program to provide the actual money for loans rather than banks (Hearn, 2001). In 2010, Congress adopted a full-scale direct lending program.

Changes to federal financial aid policy provided significant opportunities in the development of increased support for student aid. In 1993, federal grant aid represented 35% of the $36.5 billion in total grant aid and grew to 40% of the $122.7 billion awarded to students from federal, state, institutional, and private sources in 2013 (College Board, 2014). During this same time, the proportion of state grant aid declined from 13% to 8%. Specific programs such as the Pell Grant also grew substantially over the past four decades. Pell awards increased from $5.5 billion in 1978 to over $33.7 billion in 2013 [in 2013 dollars] and from 1.9 million to 9.2 million recipients (College Board, 2014). Between 1993 and 2013, new higher education loans grew from $31.3 billion to $106 billion, with the proportion of federal loans shifting from 80% to 91% of all loans awarded during that time (College Board, 2014). In part due to the increased investment in higher education, federal regulatory responsibilities also increased dramatically in the past few decades and remain an area of contention due to increased demands for accountability of federal money (Gladieux, Hauptman, & Knapp, 2010).

State governments still possess primary responsibilities for the governance and finance of public colleges and universities despite the growth of federal regulation and interest in managing higher education. Various players in the state policy arena attempt to shape and influence state higher education outcomes, including colleges and universities, state coordinating agencies, governing boards, and even the state legislature itself with varying responsibilities and agendas (McGuiness, 2011). State authority for higher education varies considerably among states

ranging from strong governing boards to coordinating agencies in states that give more autonomy to individual institutions (Tandberg, 2013).

States support higher education through a number of different methods, including direct appropriations to institutions or state governing boards, need-based and nonneed-based aid programs, and other special programs and policies that can vary greatly by state (McGuinness, 2011). Historically, states allocated over 90% of state funding directly to institutions (Toutkoushian & Shafiq, 2009). However, state funding for higher education declined over the past few decades. In 2013, state funding for higher education totaled over $81.6 billion, with over 76% of that allocated to institutional general operating expenses (SHEEO, 2014). State appropriations per full-time enrolled student declined from $8,579 in 1988 to $6,105 in 2013, in constant dollars. During this same time period, net tuition revenue increased at a faster pace than declining state support. Between 1988 and 2013, tuition revenue per full-time enrolled student increased from $2,685 to $5,475 in 2013 dollars (SHEEO, 2014). Over the past twenty years, the percentage of institutional budgets allotted from states dropped from 45.6% to 35.8%, corresponding with significant increases in tuition during this same timeframe (Mumper & Freeman, 2010).

Other state financial support involves both need-based and nonneed-based (merit) aid directly to students. McDonough, Calderone, & Purdy (2007) estimated that merit aid increased by nearly 350% between 1994 and 2004. Between 2003 and 2013, need-based grants increased from $5.04 billion to $7.06 billion in 2013 dollars, a 40% increase, while non-need based grants increased from $1.53 billion to $2.34 billion in 2013 dollars, a 53% increase (NASSGAP, 2013). In 2013, state programs awarded $3.9 billion worth of aid that had a merit component, compared to $4.9 billion awarded exclusively on need (NASSGAP, 2013). However, in 2013, state grant aid, including both need-based and nonneed-based aid programs, represented only 8% of all grant aid to students (College Board, 2014).

The consequences of declining state support in the political process also shape how state policymakers use specific policies to address issues within higher education. Orsuwan and Heck (2009) noted that states with shrinking demographics and declining state revenue considered other tools, such as increasing merit aid for in-state students, in order to retain students in the state. In turn, the rise of these programs can also impact traditional policies such as the funding for need-based aid programs (Orsuwan & Heck, 2009).

The State Policy Environment

Several contextual factors affect state governance and financing of higher education. The volatility of the state budgetary process remains an important constraint on higher education support. In many states, higher education spending depends on state income taxes and other revenue sources that vary from state to state. The political business cycle of economic booms and downturns forces legislators to prioritize state spending and introduce cuts to higher education (Delaney & Doyle, 2007). As a result, higher education tends to face considerable decreases in funding during economic downturns and budget increases during periods of economic growth; however, the magnitude of funding restoration has not kept pace with the cuts (Delaney & Doyle, 2007). Other factors associated with political volatility - including term limits, budget shortfalls, and the emphasis on fulfilling short-term demands - create a difficult environment to align long-term public interests to fund and manage higher education (McGuinness, 2011).

Structural policy issues can contribute further to issues surrounding support for higher education. For example, tax expenditure limitation initiatives (TELs) emerged as a part of the national "tax revolt" in the late 1970s and quickly spread to states that sought to limit the growth and level of state budget expenditures, including state tuition (Archibald & Feldman, 2006). The implementation of restrictive TEL statutes in Colorado forced the state to shift money to direct vouchers for students in lieu of institutional support in order to supplant some of the stringent requirements associated with the TEL policy (Archibald & Feldman, 2006). However, recent research indicated that Colorado's voucher system led to less support per student at community

colleges and decreased overall enrollment among Hispanic students but increased enrollment for African American students at community colleges (Hillman, Tandberg, & Gross, 2014).

Political ideology also remains an important factor in shaping the state policy environment. Both liberals and conservatives in state legislatures might support additional higher education funding for fundamentally different reasons, such as the promotion of improving access for minority students or increasing workforce development in technical fields (Dar, 2012). In her study on state legislative priorities, Dar (2012) also highlighted the importance of polarization on the policy process. She noted that:

> while legislators may consider that investment in higher education produces collective benefits, it is their disagreement over how to redistribute resources that comes to the forefront. If legislators become more ideologically polarized, then the increased difficulty in reaching compromises will disproportionately affect discretionary and/or less "important" policy expenditures (p. 787).

When legislators face competing pressure to support and fund key areas for their constituents, they must make difficult decisions about priorities that affect higher education. Dar and Lee (2014) found that legislatures with increased Democratic membership funded higher education at greater rates but it was conditional on the level of political polarization between both parties and factors such as the unemployment rate within the state. Others noted the growing importance of political factors such as the state economy, the role of competing state priorities such as corrections, and disparate support for certain functions or institutional types of higher education can constrain state support for higher education (McLendon, Hearn, & Mokher, 2009; Weerts & Ronca, 2012).

Interest groups and lobbyists also play an important role in the state policymaking process. In many states, coordinating boards or state agencies often lobby state legislatures on behalf of individual institutions. Despite this, some research on lobbying and higher education found that the use of centralized governing boards to lobby state legislatures has not led to

substantial gains in overall higher education funding despite their prominent role in the

policymaking process (Tandberg, 2010a). Other research noted that the use of coordinating

boards to speak as a unified voice for higher education did not translate into increased state

financial support (Tandberg, 2013). In some cases, limiting efforts by individual institutions to

lobby the state governor and legislature could decrease the overall presence of higher education in

the policymaking arena in a negative manner (Tandberg, 2013). The presence of interest groups

in other sectors of the state can also decrease higher education support by increasing competition

among funding beneficiaries, such as state agencies and colleges seeking increasingly scarce state

resources (Tandberg, 2010b).

Volatility at the state policy level also shapes institutional practices, such as setting

tuition. Despite lower state financial support, institutions weigh the political consequences of

raising tuition and must consider both legislative interests and their individual needs (Doyle,

2012). However, others argue that both federal and state policies have promulgated rising

institutional costs that lead to rising tuition. In the 1960s and 1970s, Congress attempted to

expand access to college through the use of federal financial aid through loans directly to

students, such as the Stafford loans and Parent PLUS loans (Elliott & Friendline, 2013). The

availability of this money, particularly through loans, provided many institutions with the

opportunity to increase costs by shifting the burden to students and their families as the growth of

loans outpaced other types of financial aid, such as tuition discounts (Weisbrod, Ballou, & Asch,

2008).

Higher Education and K-12 Education

Rhetoric at the state and national level emphasizes the need for better alignment between

K-12 and higher education to promote both access to higher education and success while in

college. Both the 2006 Spellings Commission Report and the National Council of State

Legislature's Blue Ribbon Commission on Higher Education call for better integration between

the high school curriculum and college preparation (NCSL, 2006; Spellings Commission, 2006).

Other efforts such as the Common Core State Standards Initiative highlight the importance of student preparation during high school in order to succeed in college (CCSSI, n.d.).

A variety of federal and state programs exist to help promote the successful transition from high school to college. The federal TRIO programs emerged with the original passage of the Higher Education Act in 1965 to promote access and support to historically disadvantaged students entering college (Bergerson, 2009; St. John, 2003). One component of the program, Talent Search, sought to identify students early in middle school in order to promote success. The federal government created a new program in 1998, GEAR UP, to partner high schools, colleges, and other community organizations and emphasize college access through campus visits and other targeted efforts (Bergerson, 2009).

Individual states also employ a variety of different programs and policies to help students transition successfully from high school to college. For example, Oregon's PASS program aligns admissions criteria with a K-12 proficiency plan (McLendon, Heller, & Lee, 2009). Other programs such as Indiana's 21st Century Scholars Program serves as a national model to create early exposure to college. This program recruits students during the 8th grade from low-income backgrounds with the incentive of covering college tuition at an in-state institution (St. John, Musoba, & Simmons, 2003). Other efforts include P-16 councils that exist in 30 states to coordinate different functions associated with improving the college transition from high school. However, research on the effects of these policies and programs has received little attention in the literature (McLendon, Heller, & Lee, 2009). In states such as Maryland, stratification across racial divides remains a serious policy issue despite the development of state policies to promote college enrollment (Perna, Steele, Woda, & Hibbert, 2005). Additionally, most programs and policies at the federal and state level focus on providing financial assistance rather than on academic preparation or knowledge about college (Perna, Rowan-Kenyon, Bell, Thomas, & Li, 2008).

State adoption of merit aid programs over the past twenty years represents a significant policy shift coinciding with substantial issues related to access and equity. Merit aid programs offer an alternative to traditional policies of financial support, such as need-based aid to students or direct institutional support (Cohen-Vogel, Ingle, Levin, & Spence, 2008). These programs provide direct aid to students who meet certain academic benchmarks in order to finance college and in many cases these programs rely on alternative funding mechanisms such as lottery proceeds rather than general revenue from the state (Ness & Mistressa, 2009). The following section will review the historical and policy contexts of merit aid programs and their importance to understand the college choice process.

Merit Aid Programs

Merit aid programs represent a natural progression of direct aid to students that emerged after World War II with the G.I. Bill and later expanded with other federal financial aid such as the Pell Grant (Alexander, 2001). State grants grew modestly in response to increased federal financial aid programs, including the State Student Incentive Grant, but states did not significantly shift from their primary strategy of direct institutional appropriations until the 1980s (St. John, 2003). Similarly, the use of state money to provide need-based aid has been prevalent throughout the country long before merit aid programs became popular (Alexander, 2001). Although some states such as Kansas and Michigan instituted merit-based scholarship programs prior to the 1990s, it was not until the creation of Georgia's HOPE program that state policymakers began seriously considering merit aid programs.

In 1991, Georgia's governor, Zell Miller, proposed a statewide lottery as a means to fund education programs, including a state merit aid program he coined HOPE (Helping Outstanding Pupils Educationally). Miller argued that students should be able to get something out of their hard work during high school, similar to what he received from the G. I. bill in order to attend the University of Georgia (HOPE Joint Study Commission, 2009). In 1992, Georgia passed a ballot initiative to establish a state lottery that provided funding for three education programs

including the HOPE scholarship (HOPE Joint Study Commission, 2009). The HOPE program grew significantly in the 20 years since its inception with the program serving over 179,000 students annually, boasting a budget of over $408 million in 2013 (Georgia Student Finance Commission, n.d.).

With the success of Georgia's HOPE program, other states followed suit and adopted similar programs. New Mexico created their Lottery Success Scholarship in 1995 through separate pieces of legislation that created a state lottery and directed lottery proceeds to the newly created program after public debate about the state lottery and Native American tribal casinos (Ness, 2008). Florida's merit aid programs began in 1980 with the Florida Undergraduate Scholars' Fund and the Gold Seal Vocational Scholarship that followed in 1982. The current program, Florida's Bright Futures, emerged in 1997 by combining the two smaller aid programs and funded this new initiative through the state lottery (McKinney, 2009). During its inception, Florida policymakers relied heavily on Georgia's model to consider the use of lottery money to fund the new program (McKinney, 2009). The creation of West Virginia's PROMISE program involved a longer two-step process that also looked toward the actions of other states. In 1999, state senator Lloyd Jackson introduced legislation to create the PROMISE program after working with staff at the Southern Regional Education Board and examining the implementation of merit aid programs in Georgia and Florida. Funding for the program was later secured by regulating gray gambling machines after it became a core issue in the gubernatorial campaign in 2000 (Ness, 2008). In Tennessee, policymakers enacted a statewide lottery in 2002 to help fund the Helping Outstanding Students Educationally (HOPE) program that looked to Georgia's HOPE model and utilized the lessons learned to better shape and craft the Tennessee program (Ness, 2008).

Merit Aid Program Characteristics

No consensus has emerged on what constitutes a merit aid program. Most studies acknowledge that programs such as Georgia's HOPE program and Florida's Bright Futures program are easily categorized as merit aid programs. However, the literature varies greatly on

what is considered a merit aid program. In some cases, programs such as Oklahoma's Promise

which includes need-based requirements, are labeled as a merit aid program (Sjoquist & Winters,

2015) while others consider it a "hybrid" program (Cohen-Vogel, Ingle, Levine, & Spence, 2008;

Mendoza & Mendez, 2013). For the purposes of this study, any program that included limited

eligibility by standardized test scores or high school GPA beyond graduation requirements were

considered to be merit aid programs. However, individual programs with both merit and need

requirements were denoted as hybrid programs.

In 2015, 32 states administer financial aid programs that utilize a merit component.

Table 2.1 presents an updated version of active programs from Domina (2014), including the year

of their adoption, the program name, the funding source, award amounts, and merit and/or need

eligibility criteria. Eight states pay for merit aid programs through the use of a state lottery –

Arkansas, Georgia, Florida, Kentucky, New Mexico, South Carolina, Tennessee, and West

Virginia (Lebioda, 2014). In the other 24 states, general revenue sources fund merit aid awards in

the form of annual appropriations or money set aside by the state legislature in trust funds. Two

states, Nevada and Louisiana, supplement merit aid programs with tobacco settlement money.

Program governance and authority vary by state depending upon its constitution and statutes. For

example, Georgia policymakers enacted an amendment to the state constitution to allow for a

state lottery that precipitated the creation of the HOPE program (HOPE Joint Study Commission,

2009).

State merit aid program structures vary by state. In some cases, state agencies run

multiple programs while other states manage a single program. For example, South Carolina

administers three separate programs that are tiered in terms of eligibility criteria and exclude

students from receiving money from multiple programs. In states such as Missouri and

Oklahoma, state agencies target different student populations with the available funding and the

eligibility criteria by administering different programs. Other programs in Arkansas and Florida

employ integrated programs where students receive varying funds based on eligibility

Table 2.1

Active State Financial Aid Programs with a Merit Component by Implementation Year

Year	State	Program Name	Funding Source	Current Award Value	Type	Need Criteria	Merit Criteria
1964	Michigan	Michigan Competitive Scholarship Program	General Revenue	$636/year	Merit & Need	Determined by State, EFC < 900	23 ACT Composite or 90 Sum Score
1974	Kansas	Kansas State Scholarship	General Revenue	Up to $1,000/year	Merit & Need	Determined by State	Top 20-30% of HS Graduates; state designation
1986	Missouri	Bright Flight Scholarship	General Revenue	Up to $3,000/year	Merit	FIPSE	31 ACT
1988	Oklahoma	Academic Scholars Program	General Revenue	Up to $5,500/year	Merit		99.5th Percentile on ACT/SAT or Institutional Nominee
1988	North Dakota	North Dakota Scholars Program	General Revenue	Tuition	Merit		95th Percentile of ACT Test Takers
1988	South Carolina	Palmetto Fellows Scholarship Program	Lottery	Up to $7,500/year (graduated scale by school year)	Merit		3.5 GPA , 27 ACT, Top 6% of Class OR 4.0 GPA and 32 ACT
1989	Wisconsin	Academic Excellence Scholarship	General Revenue	Up to $2,250/year	Merit		GPA and High School Enrollment
1991	Arkansas	Academic Challenge Program	Lottery	Up to $5,000/year (graduated scale by school type and year in school)	Merit & Need	Income	2.5 GPA and 19 ACT
1992	Oklahoma	OHLAP (Okahoma's Promise)	General Revenue	Tuition	Merit & Need	$50,000 household Income Limit	2.5 GPA in college prep courses
1992	Virginia	Virginia Guaranteed Assistance Program	General Revenue/ Endowed Fund	Up to tuition, fees, and book allowance	Merit & Need	Determined by Institution	2.5 GPA
1993	Georgia	HOPE Scholarship Program	Lottery	Tuition & Fees, Book Allowance	Merit		3.0 GPA
1995	Indiana	21st Century Scholarship	General Revenue	Tuition	Merit & Need	Income Limit by Household Size	2.5 GPA
1996	Delaware	Scholarship Incentive Program	General Revenue	Up to $2,200/year (graduated scale by HS GPA)	Merit & Need	Determined by State	2.5 GPA
1996	Mississippi	Mississippi Eminent Scholars Grant	General Revenue	$2,500/year	Merit		3.5 GPA and 29 ACT
1996	Florida	Bright Futures Scholarship Program	Lottery	Up to tuition	Merit		3.5 & 29 ACT/3.0 & 26 ACT; up to 100 service hours
1997	New Mexico	Legislative Lottery Scholarship Program	Lottery	% of tuition (95% in 2015)	Merit		2.5 GPA
1997	Louisiana	TOPS (Taylor Opportunity Program for Students)	General Revenue/ Tobacco Settlement Funds	Tuition/Fees and up to $800 stipend	Merit		3.5 & 27 ACT/3.0 & 23/2.5 & 20
1998	South Carolina	LIFE (Legislative Incentive for Future Excellence)	Lottery	Up to $4,700/year + $300 book allowance	Merit		3.0 GPA, 24 ACT, or top 30% of class (2 of 3)
1999	Alaska	Alaska Performance Scholarship	General Revenue	Up to $4,755/year	Merit		3.5 & 25/3.0 & 23/2.5 & 21

Table 2.1 (Continued)

Year	State	Program Name	Funding Source	Current Award Value	Type	Need Criteria	Merit Criteria
1999	Kentucky	KEES (Kentucky Educational Excellence Scholarship)	Lottery	Up to $1,000/year (graduated scale by HS GPA and Test Score)	Merit		2.5 GPA
2000	Nevada	Governor Guinn Millenium Scholarship	General Revenue/ Tobacco Settlement	Up to $80/credit hour; $10,000 maximum lifetime award	Merit		3.25 GPA
2001	California	Cal Grant High School Entitlement Award	General Revenue	Tuition and Fees	Merit & Need	Income Limit by Household Size	3.0 GPA
2001	South Carolina	SC HOPE Scholarship Program	Lottery	Up to $2,800 one time award + $300 book allowance	Merit		3.0 GPA
2001	Texas	Top 10% Scholarship	General Revenue	Varies (Funding Not Currently Available)	Merit & Need	Determined by Institution	Top 10% of class
2002	West Virginia	West Virginia PROMISE Scholarship	Lottery	up to $4,750/year	Merit		3.0 Core/Overall GPA and 22 ACT
2003	Missouri	A+ Scholarship Program	General Revenue	Up to $159.75/credit hour at community college	Merit		2.5 GPA & Algebra I proficiency; 50 hours of tutoring/mentoring
2003	South Dakota	South Dakota Opportunity Scholarship	General Revenue/ Endowed Fund	$1,300/year for first 3 years; $2,600 for 4th year	Merit		3.0 GPA & 24 ACT
2004	Tennessee	Tennessee HOPE Scholarship	Lottery	Up to $2,250/year (graduated by year in school)	Merit		3.0 GPA or 21 ACT
2004	New Jersey	NJ Stars	General Revenue	Community College Tuition	Merit		Top 15% in class in college prep classes
2005	Massachusetts	John and Abigail Adams Scholarship	General Revenue	Up to cost of tuition	Merit		Top 25% in district on state exams
2005	Montana	Best and Brightest Scholarship	General Revenue	$2,000/year	Merit		3.0 GPA or 20 ACT
2007	Idaho	Idaho Opportunity Scholarship	General Revenue/Endowed Fund	Up to cost of tuition	Merit & Need	Determined by State	3.0 GPA and 20 ACT
2007	Iowa	All Iowa Opportunity Scholarship	General Revenue	Up to $7,885 (one-time only)	Merit & Need	Determined by State, EFC < 7,885	2.5 GPA
2007	Indiana	Frank O'Bannon Grants	General Revenue	Up to $7,400/year + performance incentives	Merit & Need	Determined by State	Academic or Technical Honors Diploma for Incentives
2008	Utah	Regents' Scholarship Program	General Revenue	$1,000 one time; $2,500/year; $400 matching fund for 509 plan	Merit		3.0 GPA/3.5 GPA & 26 ACT
2010	North Dakota	North Dakota Academic Scholarship Program	General Revenue	Up to $1,500/year	Merit		3.0 GPA & 24 ACT
2013	Connecticut	Governor's Scholarship	General Revenue	Up to $5,000/year	Merit & Need	Determined by Institution	Top 20% of class or 27 ACT
2015	Oregon	Oregon Promise	General Revenue	Minimum $1,000 award/year at community college	Merit		2.5 GPA

Note: Adapted and updated from "Does merit aid program design matter? A cross-cohort analysis", by T. Domina, 2014, *Research in Higher Education*, 55, p. 5. Copyright 2014 by Springer Media. Individual programs updated from state agency websites and state statutes.

criteria. Additionally, most state programs make aid determinations during the student's senior

year by requiring a separate application or identifying recipients after students enroll at a

postsecondary institution. Two programs, Indiana's 21st Century program and the Oklahoma's

Promise program, require students to enroll in the program during middle school or junior high as

an incentive to perform well in high school and stay out of trouble before a state agency

determines their eligibility during their senior year.

Program awards also differ significantly across states. Some states, such as Florida and

Nevada, pay student tuition by credit hour up to a fixed cost. Others, including Louisiana,

California, Massachusetts, and New York, pay the full cost of tuition. Some states, including

Louisiana, Virginia, and South Carolina, also offer supplemental aid with book allowances and/or

stipends. Other state programs such as Arkansas' Academic Challenge, Tennessee's HOPE,

South Carolina's Palmetto Fellows and South Dakota's Opportunity Scholarship, offer incentives

for degree completion by offering graduated amounts of aid based upon the student's year in

school.   Some programs, such as Kentucky's Educational Excellence and Delaware's

Scholarship Incentive Program, provide funding based upon a graduated scale of student

performance while in high school. Utah's Regents' Scholarship program offers a $1,000 one-

time base award that can be paired with additional annual money based on student performance

and participation in a college savings plan. Most state programs offer money that can be used at a

two-year or four-year institution. However, Missouri's A+ program, New Jersey's NJ Stars, and

the newly-adopted Oregon's Promise only offer merit aid to students attending a community

college.

States utilize a variety of merit-based eligibility requirements. Eleven programs only

consider high school GPA (often in conjunction with requiring an approved core coursework

established by the state), while 19 programs use a combination of GPA and standardized test

scores. Some states also consider class rank in their requirements. A few states look at other

measures, such as Massachusetts's Adams Scholarship program that bases eligibility on state

exam performance. Some programs also require a service component, including Florida's Bright Futures and Missouri's A+ program. Additionally, some programs, such as Oklahoma's Academic Scholars, Mississippi's Eminent Scholars, Missouri's Bright Flight, and North Dakota's Scholars, offer highly competitive awards based on standardized test scores. On the other end of the spectrum, 10 programs only require a 2.5 GPA, such as Arkansas' Academic Challenge, Virginia's Guaranteed Assistance Program, and Delaware's Scholarship Incentive Program.

Twelve states support merit aid programs with need-based components. Need-based requirements also vary considerably from state to state. In almost all cases, students participating in these programs are required to complete the Free Application for Federal Student Aid (FAFSA) and submit the processed results to individual institutions and/or state agencies. Virginia's Guaranteed Assistance Program and the Connecticut Governor's Scholarship rely upon individual institutions to determine and report need to the state for qualified students, while in other state programs, such as Iowa's All Iowa Opportunity Scholarship and Indiana's O'Bannon Grants, determinations of need are made at the state level. In some cases such as Michigan's Competitive Scholarship Program and Iowa's All Opportunity Scholarship, state determinations of need limits are publicized by the results of the FAFSA calculated value of Estimated Family Contribution or income limits by household size. One program, Oklahoma's Promise, has a statutory-specified household income limit of $50,000. Other states, such as Georgia, offer recipients of merit aid a supplemental award on the basis of need (Cornwell & Mustard, 2004). Kentucky's KEES program structures its criteria around merit but also a supplemental need-based award contingent on student participation in Advanced Placement or International Baccalaureate exams. Some of the literature that has examined programs such as Oklahoma's Promise refer to them as "hybrid" programs because they include both various measures of student academic merit and financial need (Mendoza & Mendez, 2013).

Despite their widespread adoption, some states eliminated merit aid programs due to shifting state priorities. Two states, Washington and Maryland, ended their programs in 2004 and 2006, respectively (Domina, 2014). In 2011, Michigan eliminated their Michigan Promise Program which in turn had replaced an earlier merit scholarship program in 2006 (Daun-Barnett, Hermsen, Vedder, & Mabry, 2013). Michigan's remaining merit program offers up to $636 per year for students with high need. In Texas, the state legislature did not fund its Top 10% Scholarship in 2015 but can fund it in later years. In other states, scholarship amounts have declined in relation to declining revenue. For example, due to declining state revenue, New Mexico's Lottery Success program recently reduced the coverage of the award to 95% of tuition rather than covering the full cost.

The prominence of merit aid programs remains a critical issue in higher education due to their widespread adoption and relative success. Merit aid programs remain popular among policymakers due in part to high levels of participation from students who benefit from them. In Georgia alone, since 1993 over 1.5 million students have participated in the HOPE program at a cost of over $7 billion (Georgia Student Finance Commission, n.d.). Florida's Bright Futures program has served over 2 million students with over $4.2 billion disbursed (Florida Department of Education, n.d.). In 2011, the main Tennessee HOPE programs served almost 70,000 students at a cost of over $277 million (Tennessee Higher Education Commission, 2013). The popularity of these programs also created a critical research agenda among scholars and practitioners to examine the effects of program adoption. Research on merit aid programs has focused on the success of these programs to address key policy outcomes such as increasing access and reducing the number of students attending college out-of-state, a phenomenon known as outmigration (Toutkoushian & Hillman, 2012; Zhang, Hu, & Sensenig, 2013).

Theories of Merit Aid Policy Adoption

A number of theoretical frameworks exist to describe and analyze policy processes and outcomes related to merit aid programs. The literature utilizes two prominent theories, the policy

diffusion model and the multiple streams model, to examine merit aid policy adoption. Policy

diffusion was developed originally by J. L. Walker and popularized by Berry and Berry (1990).

This theory purports that state policy development does not occur in a vacuum and policymakers

respond to the policy choices of other states while also considering internal factors (Berry &

Berry, 2010; Doyle, 2006). Specifically, the actions of other states motivate policymakers to

emulate successful policies by attempting to learn from actions of other states, the visibility of

competition among states, and the pressure to conform to national or regional standards (Berry &

Berry, 2010). In some ways, increased communication across states through participation in

national and regional organizations and other normative socialization options (such as graduate

training) can also facilitate policy diffusion (Berry & Berry, 2010). A critical component of the

policy diffusion model is the innovation that occurs that other government units seek to emulate.

As a result, policy innovation spreads across states as policymakers utilize the lessons learned

from other states to modify and implement their own programs in order to fit the needs of their

own state. Berry & Berry (2010) suggested that policy diffusion models are often insufficient by

themselves to account fully for policy adoption and that they can be used in conjunction with

other models.

The policy diffusion approach gained popularity to explain how policy innovation in

higher education occurred across states. McLendon, Heller, and Young (2005) examined higher

education policy innovation across 49 states by focusing on accountability and finance policy

adoption. Although they did not find evidence of diffusion related to accountability policy

adoption, they identified significant support for the adoption of finance policies, such as prepaid

tuition plans, college savings plans, and merit aid programs. They noted several possible

explanations for this, including increased competition for students across state borders, electoral

considerations to adopt successful programs, and the increase in professionalization among state

policymakers with the rise of professional associations. They also signified the importance of

policy change over time, including the potential for diminishing relevance of policy adoption in other states (McLendon, Heller, & Young, 2005).

Other research on merit aid also utilized the policy diffusion theoretical framework. Much of the attention on diffusion and merit aid policy adoption centered on policy adoption among states in the southeastern United States. Cohen-Vogel, Ingle, Levine, & Spence (2008) reviewed documents and interviewed political actors in 13 southeastern states that adopted merit aid programs and found widespread support for policy diffusion from state policymakers who utilized other states' examples when formulating their own policies. For example, in the case of Tennessee's merit aid adoption, policymakers connected with their peers in Georgia, West Virginia, Louisiana, and South Carolina. Policymakers also identified the importance of both regional and national professional associations to share ideas and information across state borders about the specifics of merit aid programs (Cohen-Vogel, Ingle, Levine, & Spence, 2008). In the account by Ness (2008) on Tennessee's adoption of a state lottery to fund a merit aid program, he identified that policymakers and stakeholders often would turn to the Georgia model for the purposes of crafting their own policy and establishing program eligibility requirements.

Other studies examined the context by which regional diffusion occurred. Cohen-Vogel and Ingle (2007) noted the importance of regional contextual factors, including the use of common language and rationale (such as retaining students in-state or promoting workforce development), as a means for policy adoption. During this time, phrases such as 'brain drain' emerged among both policymakers and the media as a way to frame the importance of these programs. In turn, the use of this language increased the salience of adopting merit aid programs that made it easier for policymakers to obtain broader support to fund them, in many cases through a state lottery (Cohen-Vogel & Ingle, 2007). However, other research noted the importance of internal determinants that inhibited diffusion (Ingle, Cohen-Vogel, & Hughes, 2007). In some cases, states such as North Carolina, Alabama, and Virginia did not follow suit with other regional states to adopt merit aid programs. Ingle, Cohen-Vogel, and Hughes (2007)

found that the setting within a specific state mattered. For example, in both Virginia and North Carolina, higher enrollments at state schools did not present an untapped demand for a new program. In Alabama, concerns about the potential for grade inflation presented a significant barrier to adoption but did not stop other state adopters who had identified similar issues. Economic conditions in Alabama and the salience of competing priorities in Virginia and North Carolina also limited broader support for merit aid policy adoption (Ingle, Cohen-Vogel, & Hughes, 2007). Additional research (Doyle, 2006) found no support for regional diffusion among merit aid policy adoption, and instead that state policymakers adopted merit aid programs in response to specific factors such as lower college attendance and retention rates.

Other scholars turned to alternative models of policy adoption in light of some of the limitations of policy diffusion to explain the expansion of merit aid policy adoption. One such framework was Kingdon's multiple streams model. This concept noted the incremental nature of policy adoption and that many factors influence policy adoption. Kingdon identified three streams that comprise the agenda setting process to policy adoption - problems, politics, and policies (2010). The first stream, problems, related to external issues or problems that policymakers can identify. The second stream, politics, concerned the dynamics of power, ideological struggles, or partisan relationships among policymakers and their perceptions of political trends. The third stream, policies, reflected the various options available to address issues, including the complexity of the solution as well as its costs (Kingdon, 2010).

Kingdon argued that these streams flow independently but policy change often emerges when the streams couple together and a policy window, or opportunity, emerges that allows policy to change. The other important concept of this model is the role of key leaders to capitalize on policy windows. Policy entrepreneurs, including experts in a specific field, interested individuals, and elected officials can take advantage of the couplings and windows to influence the process toward their preferred outcome (Kingdon, 2010). Kingdon's model is a significant tool for understanding that policy change does not emerge without both the alignment

of various factors and the opportunity for leaders to take advantage of that alignment to enact change.

The multiple streams model remains an important fixture in state merit aid research. Ness (2008, 2010) analyzed the policy formation process in three states -Tennessee, New Mexico, and West Virginia - and found that a revised version of the policy streams model, when compared to several other frameworks, best explained the development of eligibility criteria in each of those state's merit aid programs. In this revised model, Ness (2008) also highlighted not only the critical role of policy entrepreneurs to set eligibility criteria in each of the three states studied but also the leadership that these entrepreneurs brought to the process. Cohen-Vogel and Ingle (2007) noted the influence of key actors (such as Patrick Taylor, a Louisiana businessman who started a foundation to provide scholarships to low-income students) to sit down and discuss the idea of a merit aid program with Governor Bill Clinton leading to his support for a similar state program in Arkansas. Other research such as Doyle (2006) and McLendon, Heller, & Young (2005) also noted the role of policy entrepreneurs in the merit aid adoption

Other studies examined the role of policy entrepreneurs in merit aid adoption in states beyond the southeastern United States. Ingle and Petroff (2013) examined four states, Alaska, Massachusetts, Michigan, and Nevada, and found that internal factors, including the overall economic health of the state, as well as the ability of policy innovators such as the governors in each state, had real implications on the adoption of merit aid programs. They identified the importance of various policy entrepreneurs with regard to leading and supporting roles that made merit aid adoption possible in each state. In Alaska, for example, the role of outside policy entrepreneurs such as the Taylor Foundation highlighted the role of external influences on policymakers. The availability of new funding sources, such as the tobacco settlement money, also allowed policymakers in both Michigan and Nevada to fund the new merit aid programs (Ingle & Petroff, 2013).

Both policy diffusion and multiple-streams models are useful tools when considering merit aid policy adoption, but do not fully account for the widespread implementation of these programs across the United States by themselves. In some states, policy diffusion occurred as policymakers conferred with their peers in other states to adopt and modify their own merit aid programs (Cohen-Vogel and Ingle, 2007; Cohen-Vogel, Ingle, Levine, & Spence, 2008). In other states (Alabama, North Carolina, and Virginia) internal determinants and other state priorities led policymakers to revisit adoption of merit aid programs, while in other states (Alaska, Michigan, Nevada, and Massachusetts), the same determinants, including policy entrepreneurship, led to successful program adoption (Ingle, Cohen-Vogel, & Hughes, 2007; Ingle & Petroff, 2013; Ness, 2008).

Student Outcomes of Merit aid Policy Adoption

Both multiple streams and policy diffusion models provide competing perspectives on the development and importance of merit aid programs and how they have come to fruition in a number of states over the past twenty years while other perspectives on the role of merit aid programs shifted attention to the intended and unintended outcomes of these policies. Understanding the effects of adopting merit aid programs can remain an important part of the public policy process due to the iterative nature of the policy process to evaluate and modify programs over time. Prior to the Georgia HOPE program, little research on direct state merit aid to students existed. Twenty years later, a plethora of scholarship exists about the effects of these programs. Policymakers designed state merit aid programs to influence individual student behavior regarding attending college and this aligns with models of college choice such as Perna (2006a) that recognize the relationships between larger policy contexts and individual student choice.

During the policy adoption process, stated goals about merit aid programs shaped and influenced the decisions of many state policymakers. Many of these intended outcomes centered on state public policy influencing individual student behavior. For example, some of the intended

47

outcomes of the Georgia HOPE program included improving academic performance in high

schools and reducing the number of students choosing to attend college in other states (Condon,

Prince, & Stuckart, 2011). In Florida, the stated goals of the Florida Bright Futures program

incentivized high school performance to prepare for college, directed public money to benefit

status, and improved access while also stemming the outmigration of Florida high school

graduates leaving the state to attend college in neighboring states (McKinney,

2009). Tennessee's task force responsible for proposing the Tennessee HOPE program outlined

that the intended outcomes the program were " (1) provide access, (2) to retain the best and the

brightest, (3) to improve the academic achievement in high school, and (4) to bolster the

state workforce" (Ness, 2009, p. 113).   Other research on merit aid programs affirmed similar

goals across programs, including increasing high school achievement and college preparation

(Cohen-Vogel, Levine,& Ingle, 2007; Cohen-Vogel, Ingle, Levine, & Spence, 2008), improving

overall access to higher education (Cohen-Vogel, Levine, & Ingle, 2007; Cohen-Vogel, Ingle,

Levine, & Spence, 2008 Ness, 2008), discouraging student outmigration (Cohen-Vogel, Ingle,

Levine, & Spence, 2008; Condon, Prince, & Stuckart, 2011), promoting the state workforce

(Cohen-Vogel, Levine, & Ingle, 2007), and improving success while in college (HOPE Joint

Study Commission, 2009).

     The stated outcomes of merit aid programs have facilitated important research on whether

individual programs have progressed toward fulfilling state policy goals. These stated outcomes

allowed researchers to examine outcomes across programs and states in order to understand the

impact of merit aid programs. The following section elaborates on the current state of the merit

aid literature by examining their influence on student behavior.

     High school performance and college preparation. Research on merit aid programs has

identified several positive results on student performance in high school performance and college

preparation. Henry and Rubenstein (2002) found that the adoption of Georgia's HOPE program

led to more students earning better grades in high school and increased standardized test scores

for some student populations. In addition, African American students demonstrated higher gains than students from other racial groups. In Florida, the implementation of a merit aid program increased both college preparation and high school performance (Harkreader, Hughes, Tozzi, & Vanlandingham, 2008). Other research that used nationally-representative data determined that students in merit aid states took math classes at higher rates than in non-merit aid states; however, there was no evidence that students in merit aid states scored higher on math exams (Domina, 2014).

       College access and choice. Policymakers have also designed merit aid programs to encourage more students to attend college. Zhang, Hu, and Sensenig (2013) found a marked increase in Florida enrollment among public institutions, including 2-year institutions, after the adoption of their Brighter Futures program. In another study, Ness and Tucker (2008) examined Tennessee's merit based program and found that merit aid played a larger role in the decision process for minority students and also created a positive increase in college access. Toutkoushian and Hillman (2012) conducted a study utilizing data from all fifty states and examined student-level indicators such as individual socioeconomic variables that influenced students' decision to attend college. They found that merit aid influenced students' choice of attendance more greatly than other sources of funding such as state appropriations or need-based aid.   However, other researchers have questioned whether population growth could affect growth in college enrollments rather than the adoption of merit aid programs (Stanley & French, 2009). Other studies, such as Sjoquist and Winters (2015), also questioned whether merit aid programs influence college attendance. The researchers utilized national data available from the 2000 Census and data from the American Community Survey from 2001 to 2010 to examine 25 states that adopted merit aid programs between 1991 and 2004. The authors also classified programs as "weak" or "strong" depending upon the amount of state money spent per student on the program and the percent of students participating in the program. They found little evidence across states indicating that merit aid programs affected college participation (Sjoquist & Winters, 2015).

Another thread in the research on merit aid has explored its effect on college choice. Kim (2012) utilized an economic model of college choice by looking at both need-based aid and merit aid and determined that the availability of merit aid lowered the odds of attending a non-competitive school. However, differences across student backgrounds and the availability of both types of aid produced mixed results about its true effect across groups (Kim, 2012). Cornwell, Mustard, and Sridhar (2006) identified significant growth in freshman enrollment after adoption of the Georgia HOPE program at four-year public and private institutions but little growth at two-year institutions. African American students also demonstrated more pronounced gains in enrollment and attendance at a four-year institution than other student populations (Cornwell, Mustard, & Sridhar, 2006). Zhang, Hu, Sun, and Pu (2016) utilized a regression discontinuity strategy to compare students slightly above and below the eligibility requirements for Florida's Bright Futures Scholarship program to evaluate whether the program affected college choice. They found significantly higher probabilities of college attendance in Florida as well as attendance at a four-year institution for students above the eligibility requirements than for those students who missed them. They also found significant positive differences for students who just met the criteria for the top-tier award of the program than for those who met the lower-tier.

Toutkoushian, Hossler, DesJardins, McCall, and Canche (2015) examined the effect on college choice from student participation in Indiana's 21st Century program, an early intervention program with a significant financial need component. Their study utilized individual student data and propensity score weighting to identify program participants and match them with non-participants in order to measure differences across both groups. The authors concluded that program participants were more likely to attend college than non-participants and were also more likely to attend an in-state institution. One interesting dynamic of their study is that unlike other analyses of the 21st Century Program, the authors considered students who enrolled in the program as opposed to those who actually completed it. By doing so, their results showed more modest effects than similar studies of the program.

Outmigration. Discouraging in-state students from attending institutions in other states has also remained an important policy goal of merit aid programs. Orsuwan and Heck (2009) analyzed data from fifteen states with merit aid programs and concluded that the adoption of a merit aid program alone did not deter students from attending an out-of-state institution but that merit aid coupled with other state support could discourage outmigration. Other research found that the availability of merit aid coupled with need-based aid and overall state funding of higher education encouraged students to attend in-state institutions rather than going to college in another state (Toutkoushian & Hillman, 2012). In Florida, for example, Hickman (2009) identified positive evidence that the availability of merit aid reduced the likelihood that students would attend college in another state. Zhang and Ness (2010) attributed increases in overall in-state enrollment and decreases in out-of-state enrollment to merit aid programs but also noted that the effects were contingent on the eligibility requirements and scholarship award amounts in students' home states.

College performance and completion. Research on merit aid has also explored how programs affect student behavior while attending college and has found mixed results about their impact. Delaney (2007) determined that the availability of merit aid in Kentucky increased the likelihood that students would major in STEM fields. However, any decreases in the award amount from the state increased the likelihood of students switching to a non-STEM field. Delaney also demonstrated that students were more likely to take full course loads after the scholarship program was implemented in the state. Cornwell, Lee, and Mustard (2005) examined the influence of Georgia's HOPE program on students in college and found that the program reduced the number of students taking full course loads and increased the likelihood of course withdrawals, particularly for those students who were close to the eligibility requirements for the program and were at risk to lose eligibility.

The availability and structure of merit-based aid programs can also impact the types of degrees sought by participating students. Zhang (2011) examined whether merit aid programs in

Georgia and Florida influenced students to not major in a STEM field in order to meet and maintain eligibility requirements. He concluded that both the Georgia HOPE and the Florida Bright Future programs increased the overall number of students graduating with bachelor's degrees in both STEM and non-STEM fields. Zhang also determined that the scholarship renewal requirements did not appear to influence students to choose a non-STEM field in order to maintain scholarship eligibility (Zhang, 2011).

Other studies have focused on student success while in college. Examining college persistence in Oklahoma, Mendoza and Mendez (2013) concluded that students who received state financial support through the Oklahoma's Promise program were more likely to persist in college, particularly during their first year. Henry, Rubenstein, and Bugler (2004) found that students who were eligible for Georgia's HOPE program performed better in college than their peers in terms of their college GPA, the number of credit hours they completed, and their persistence to graduate. However, they also indicated at the time that over 70% of students who initially received the HOPE scholarship would lose their eligibility and upon losing HOPE funding, these performance indicators decreased to comparable levels of their peers.

The presence and availability of merit aid can lead to other institutional and societal goals such as college retention and success. Mendoza and Mendez (2013) examined the role of federal and state grant aid in Oklahoma and its relationship to student retention at Oklahoma universities. The authors conducted a longitudinal study of aid recipients to understand whether students ended up graduating after six years at the same institution and found that the impact of aid varied considerably across groups but with noticeable effects on minority groups, including Hispanics and Native Americans.

Post-Graduation Effects. More recent research has started to examine whether efforts at keeping students in their home state for college translates into effects after graduation, including whether students choose to stay in their home state. Groen (2011) noted that in some cases students might be persuaded to stay in their home state after graduation due to relationships

developed while in college that would increase the likelihood of obtaining work in that specific state. Realistically speaking, Groen suggested that this effect would be minimal at best. He explained:

> Merit aid programs do provide a financial incentive to attend college in state, but once college is over, they do not provide any direct financial incentive for graduates to stay in the state. The scholarship funds have already been paid out, and graduates are free to locate where the opportunities are greatest (p. 36).

Groen's argument illustrated the significant challenge of determining the long-term outcomes of public policy programs such as merit aid. In this case, the availability of merit aid might influence a student to attend an in-state institution. The impact of merit aid became more nebulous when considering career options after graduation. In a similar thread, Sjoquist and Winters (2014) found that the number of students who remained in their home state varied widely by state and that a combination of other attributes about the state made it desirable for students to live there after graduation. However, they concluded that states with lower in-state retention rates prior to merit aid implementation saw the greatest effect of policy adoption (Sjoquist & Winters, 2014).

Effects across racial and ethnic groups. Other scholars have explored the participation of various underrepresented student populations. Farrell (2004) studied five states that had implemented merit aid programs between 1993 and 2000 and determined that in every state, White students benefited disproportionately compared to their relative percent of the total high school graduates in each state. She also found that students from wealthier school districts and counties were overrepresented in merit aid programs (Farrell, 2004). Other scholars, such as Cornwell and Mustard (2004), concluded that Georgia high schools with large populations of African American students had proportionally fewer HOPE-eligible students. However, they also found that the number of African American students attending historically black colleges and universities in Georgia increased substantially after adoption of the HOPE program.

Similarly, Ness and Tucker (2008) analyzed Tennessee's Education Lottery Scholarship to determine whether it enabled access to higher education for under-served students from low-income and minority populations. In their analysis the authors noted that the Tennessee program had the lowest academic requirements for any merit-based programs (Ness & Tucker, 2008). They found that a greater proportion of lower-income students benefited from the program than higher-income students. African American students were also more likely than White students to attend college as a result of the scholarship program. However, they found that the broad eligibility requirements enabled the program to distribute merit aid to students and families with the least amount of need (Ness & Tucker, 2008). In many ways, the program positively impacted minority and low-income students college attendance but in an inefficient manner. As Ness and Tucker (2008) noted:

> Ultimately, it seems that inefficient financial aid policies are most sustainable due to their broad political appeal. If we are to accept this premise, then the most important issue becomes how these policies treat traditionally under-represented students. Thus, the principal implication could be that a liberally awarded merit scholarship program, while inefficient, may provide sustainable access for those students in greatest need of financial aid (p. 581).

This example further demonstrates not only that policy formation and implementation can vary widely across states but also that any outcomes associated with merit aid programs are contextual due to the characteristics of the program and other factors. In many ways, program design and implementation can net positive results, such as the case in Tennessee, but at the expense of alternative options.

The Broader Effects of Merit Aid Policy Adoption

The discussion thus far has examined how merit aid programs have influenced student outcomes that range from college access to post-graduation outcomes. An emerging element within the literature explores how the implementation of these programs influences the decisions

and actions of other players that can shape the college selection process. This section will identify the significant effects of merit aid programs on related stakeholders, including high schools, individual colleges and universities, and the states themselves.

High school effects. State merit aid programs also have the opportunity to influence outcomes beyond individual student behavior. Interestingly, little research exists on how merit aid policy adoption influences the actions of high school administrators and counselors to increase student participation in merit aid programs, a surprising fact given the emphasis on college preparation during high school at the national level. Hargis (2007) conducted a study of three Tennessee high schools by interviewing high school counselors and students in order to understand the actions taken by the schools to promote Tennessee's merit aid program. She found widely varying efforts at using the state aid program to encourage students to attend college. School resources, knowledge about the scholarship program, time constraints due to other demands on counselors, and other efforts by staff to promote college access and choice varied widely among the three schools.

College and university effects. State merit aid programs can also direct the behavior of higher education institutions. For example, state merit-based aid can also factor into the availability of other types of aid offered by specific institutions within a state. Doyle, Delaney, and Naughton (2004) articulated that institutions often respond to the direction of state policy in support of the preferred type of aid offered. They analyzed states based upon policy goals regarding merit aid and focused on comprehensive four-year institutions to determine whether the institutional policy goals were in line with the state goals. In this particular study, institutions seemed to reinforce existing policy set forth by the state with respect to how they offered financial aid (Doyle, Delaney, & Naughton, 2004).

In a follow-up study, Doyle, Delaney, and Naughton (2009) explored how state merit aid programs influenced the institutional aid offered by specific colleges and universities. They found mixed results with respect to how institutions respond to state aid programs. First, they

determined that institutions are less responsive to offering their own need aid when a state offers need-based aid. As a result, "institutions do not necessarily use institutional aid to complement state policy, but sometimes use it to align with the de facto direction of state policy" (Doyle, Delaney, & Naughton, 2009, p. 521).

In some cases the availability of state merit aid shaped the availability and marketing of institutional merit aid programs. Ness and Lips (2011) compared flagship institutions in merit aid states to states without merit programs and found that the state merit aid programs became the centerpiece of the institution's merit aid strategy while colleges in states without merit aid programs focused instead on their own institutional merit aid programs. Institutions in merit aid states also emphasized their own institutional aid as complements to the overall state program by using language about affordability and transparency in the eligibility requirements to demonstrate alignment with the state program (Ness & Lips, 2011).

Other research has focused upon specific programs and their impact on cost and tuition-setting. Long (2004) examined the institutional impact of the Georgia HOPE program after it was enacted to determine whether institutions raised tuition prices in response to the availability of additional state resources. She found that institutions did not suffer any decline in state appropriations as a result of the HOPE program adoption in the state and concluded that Georgia public schools kept tuition costs relative to their competitors while private institutions raised tuition prices at a higher pace (Long, 2004).

Effects on other state programs. State policies and priorities can reflect the both the implementation and outcomes of merit aid programs. For example, the popularity and adoption of merit aid programs can influence other state priorities such as funding for need-based aid. Doyle (2010b) noted that need-based aid traditionally enjoyed a larger amount of state support than merit aid but that the proportion of need-based aid shrank between 1984 and 2005. To understand whether this shift caused the rise of merit aid, Doyle (2010b) explored the intersection of both types of financial aid offered by states and found that policymakers have created merit-

based programs with little impact on the availability of need-based aid in states. He attributed this to several factors, particularly to the fact that there are still more states with need-based aid programs than states that have both merit and need-based aid programs.

Summary

This brief review of the literature illustrates the complex nature of student college choice and how various factors have shaped public policy as a tool to influence individual student decisions. Perna's (2006a) model of college choice provides a useful framework to examine the relationship among contextual layers that all seek to shape student perceptions, particularly for those students who lack the social and cultural capital to understand the complexity of the college choice process. Within the context of this study, the adoption of state merit aid programs by policymakers represents one form of policy intervention to affect student behavior by discouraging outmigration and encouraging in-state access and enrollment. However, insufficient research exists to understand how other contextual layers, particularly high schools, affect participation in public policy programs. With increased pressure at both the state and national level to tie high school activity with college readiness, a gap in the research exists to explore whether the attributes of high schools mediate participation in state financial programs such as OK Promise.

CHAPTER III

METHODOLOGY

Existing research on student college choice identified several important themes that affect student decisions, including public policy at the state level. Integrated models of student college choice, such as Perna's (2006a), constituted important frameworks to understand the complexity of the choice process. This multi-layered approach considered how the habitus and circumstances of the individual student affect college choice and the role that other contextual factors play, such as the student's high school and community, the higher education environment in their state, and the larger public policy framework. In addition, policy scholars have studied the effects of specific public policy programs – state merit aid programs – to understand the effect of their design and implementation on student outcomes related to higher education access and choice (Cohen-Vogel, Levine,& Ingle, 2007; Cohen-Vogel, Ingle, Levine, & Spence, 2008; Toutkoushian & Hillman, 2012; Zhang, Hu, & Sensenig, 2013).

Disparities of college-going behavior across high schools with demographic characteristics suggest that the availability of state financial aid programs alone cannot explain a review of the college choice and merit aid literature found little research regarding the alignment of high school characteristics and the policy goals of merit aid programs. This chapter will describe the research design of this study that examines the nexus between high school factors and participation outcomes in a state hybrid aid program. This chapter includes five sections: the statement of purpose and research questions, the epistemology and theoretical perspective, the study sample, the context of the study, and the research design.

Statement of Purpose

The purpose of this study was to examine whether contextual factors at the high school level predicted participation rates and postsecondary attendance rates associated with a state financial aid program in the state of Oklahoma. This study addressed the following research questions:

1. Do contextual factors in Oklahoma public high schools, including school demographic characteristics, the staff to student ratio, the level of parental involvement, the college-going rate, and average ACT scores, affect the percentage of students by high school that participated in Oklahoma's Promise, a state hybrid aid program?

2. Do contextual factors in Oklahoma public high schools, including school demographic characteristics, the staff to student ratio, the level of parental involvement, the college-going rate, and average ACT scores, affect the completion percentage of students by high school enrolled in OK Promise?

3. Do contextual factors in Oklahoma public high schools, including school demographic characteristics, the staff to student ratio, the level of parental involvement, the college-going rate, and average ACT scores, affect the percentage of students that completed Oklahoma's Promise and attended a public research university after graduation?

Epistemology and Theoretical Perspective

This study examined whether a causal relationship existed between high school characteristics and student participation in a state financial aid program. Objectivism represented an appropriate epistemology for this study and this framework states that singular view of reality exists regardless of how that an individual knower perceives reality (Crotty, 2003). Post-positivism aligned closely as a theoretical perspective with the underlying assumptions of objectivism. This theoretical perspective articulates that truth exists and can be determined using logic and empirical tests while acknowledging that both situational contexts and researcher

choices shape the obtained knowledge (Patton, 2002). This study used a quantitative design and statistical analysis aligned with the epistemological and theoretical framework outlined above.

Context of the Study

This study used the state of Oklahoma as the setting for this study given its demographic characteristics and the structure of public education at the state level. Over 3.7 million individuals live in Oklahoma. At the 2010 census, Oklahoma ranked 28th in population size among states (U.S. Census, 2012). Demographically, 72% of Oklahomans are White, 7% African American, 9% Native American, 2% Asian American, and 6% with two or more races (U.S. Census, 2012). Per capita personal income in 2012 was $41,399 and ranked 28th among the states (NEA, 2015). The median family income in 2013 was $56,655 (U.S. Census, n. d.) However, in 2012 Oklahoma ranked 45th among the states in terms of state and local tax revenue per $1,000 of personal income (NEA, 2015). Politically, Oklahoma is a conservative state with Republicans controlling the entire congressional delegation, the governorship, and both chambers of the state legislature.

The state of Oklahoma governs K-12 and higher education separately. Higher education falls under the auspices of the Oklahoma State Regents for Higher Education (OSRHE) while primary and secondary education rests with the Oklahoma Department of Education (ODE). ODE is comprised of an elected state superintendent and a State Board of Education who jointly oversee the entire state school system. Additionally, there are 551 public school districts with locally-elected boards that manage the 463 public high schools in the state (ODE, n. d.). In 2012, 39,085 students graduated from Oklahoma high schools (OSRHE, n. d.). Additionally, Oklahoma's college-going rate ranks 35th among states at 60.2%, slightly below the national average (NCHEMS, n. d.)

Funding for primary and secondary education remains significantly lower than most states as Oklahoma ranks 49th among the states in per student expenditures (NEA, 2015). In 2013, almost 27% of funding for education came from local sources mostly in the form of

property taxes, while 60% came from the state and 13% came from federal sources (ODE, 2013). The state allocates its funding on the basis of a formula that considers a variety of factors to assist school districts with distinct student populations and needs.

Oklahoma higher education represents 25 different institutions, including 2 research universities, 10 regional universities, 1 public liberal arts university, 12 community colleges, and a number of private institutions (OSRHE, n. d.). OSRHE serves as a statewide coordinating board to govern higher education with considerable responsibilities over degree requirements and offerings, state appropriations to individual institutions, authority over setting tuition, state financial aid administration, statewide survey and research administration, and the accreditation of private institutions. Oklahoma's governor appoints nine statewide regents and the Oklahoma Senate confirms their appointment. The Chancellor reports to the regents and serves as the chief executive officer of the state system. At the institutional level, three constitutional governing boards manage the four-year institutions identified and empowered by the Oklahoma Constitution while 12 statutory boards oversee the community colleges. Each of these boards manage the overall administration of each institution, including institutional employees, budgets, contracts, securing property, construction, and other fiduciary responsibilities.

Oklahoma's Promise

OSHRE also manages several state-wide programs, including the Oklahoma Higher Learning Access Program, otherwise known as Oklahoma's Promise (OK Promise), a state financial aid program. The state of Oklahoma enacted the OK Promise program in 1992 as a means to provide additional higher education access to Oklahoma high school graduates. The program provides tuition costs for eligible students at any public institution in the state or equivalent money at a private institution in the state for up to five years. Statutory provisions guarantee annual funding not subject to the annual appropriations process. OK Promise serves as an early-intervention program that engages students in the college selection process by requiring them to apply to the program during the 8th, 9th, or 10th grade. Students can participate in the

program with a combined family income less than $50,000. Unlike other types of aid programs, scholars have classified OK Promise as a "hybrid" program because it encompasses both student merit and financial need into its eligibility requirements (Mendoza & Mendez, 2013).

In contrast to the eligibility requirements of other state financial aid programs, OK Promise requires a significant investment of family and school support for students to participate in the program. The programs engages parents in the process by requiring them to provide relevant tax information on the application and assist with the completion of the FAFSA during the student's senior year in high school in order to obtain the tuition benefits. High schools also play a significant role through managing OK Promise and are required to identify a contact person at each school for the program. OSRHE supplies recruitment materials for the program directly through an ordering process on their website to support the high school recruitment efforts. Each school must also report whether each student fulfills eligibility requirements including reviewing the student's high school curriculum to ensure that they complete a 17 core unit curriculum with the minimum core GPA of a 2.5 or higher. High school staff members also evaluate each OK Promise student and report whether the student completed other requirements such as staying out of trouble and doing their homework and then report their recommendations for all OK Promise students to the state.

Upon graduation, students must complete a second income check to ensure that their family does not make more than $100,000. Students must also meet a number of other stipulations during their college enrollment in order to continue receiving funding including achieving a minimum college GPA of a 2.0 during their first two years and a 2.5 GPA during their junior and senior years. Students must also meet the eligibility requirements associated with federal Satisfactory Academic Progress guidelines for degree completion.

Students who successfully complete the program receive their tuition paid at the corresponding institution where they enroll depending upon the number of enrolled credit hours by per semester. OSRHE annually publishes the scholarship rates for each institution on their

website and in 2014, these rates varied from $69.10 per credit hour at Carl Albert State College, a

public community college, to $203 per credit hour as a part of the Reach Higher Adult Degree

completion program offered at several regional institutions and community colleges. Some

institutions also offer supplemental awards to OK Promise students in order to offset additional

costs such as fees or books. The Cowboy Covenant program at Oklahoma State University and

the Sooner Promise program at the University of Oklahoma both offer an annual supplemental

award of $1,000 per year to enrolled students who complete the requirements of OK Promise.

OK Promise has enjoyed significant success during its existence. During the 2013-2014

year, the OK Promise program awarded over $60 million to almost 19,000 students (OSRHE,

2014). 45% of OK Promise students resided in one of Oklahoma's five most populous counties.

Additionally, more females participated in the program than males (59% vs. 41%) despite

females representing 49% of Oklahoma high school seniors. OSRHE research found that

students who completed OK Promise had a higher overall GPA (3.41 on a 4.0 scale in 2013) than
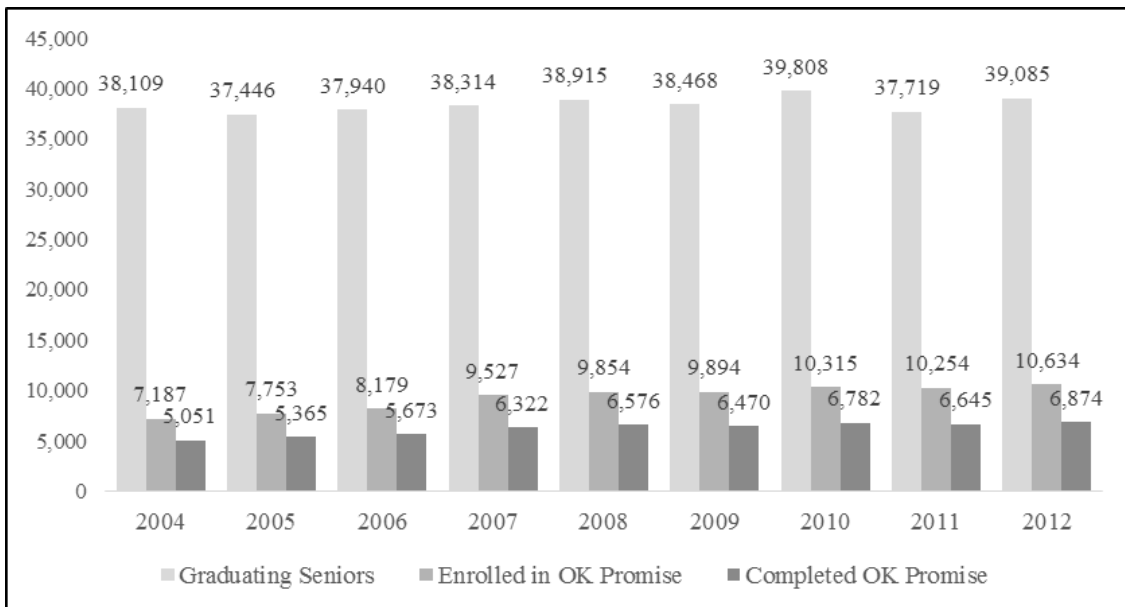
Figure 3.1. Count of Oklahoma high school graduates and Oklahoma's Promise participation by year. Adapted from
Oklahoma's Promise 2013-2014 Year End Report and *2012 Oklahoma High School Graduates-Projections.* Copyright
2016 by Oklahoma State Regents for Higher Education.

the overall Oklahoma senior class (3.05 in 2013). OK Promise students participated at a higher

rate to take the ACT than their peers with similar family incomes (73% vs 30%, respectively).

OK Promise students who completed the program participated in higher education at substantially

higher rates than students not in the program (87% vs. 46% in 2013). Students who completed

OK Promise also demonstrated better performance while in college than their peers who did not

participate in the program, including first-year retention (81% vs. 71% in 2013); 6-year

graduation rates (49% vs 39% for students entering college in 2008); and slightly higher

employment rates after graduation than other Oklahoma graduates (87.1% vs. 85.7% in 2012).

 Despite the success of many OK Promise students, participation in the program

represents only a fraction of all Oklahoma students. Figures 3.1 and 3.2 displays the trend from

2004 to 2012 for Oklahoma high school graduates, seniors who enrolled in OK Promise, and

seniors who completed OK Promise. During that time period the number of students enrolling in
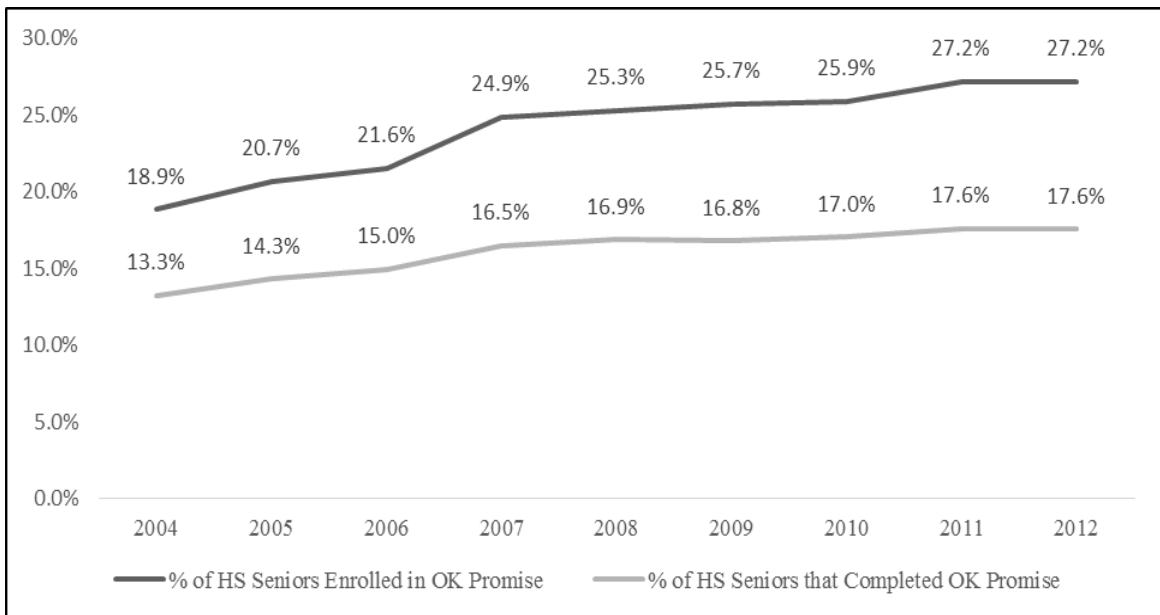
Figure 3.2. Percentage of Oklahoma high school seniors participating in Oklahoma's Promise by year. Adapted from *Oklahoma's Promise 2013-2014 Year End Report* and *2012 Oklahoma High School Graduates-Projections,* Copyright 2016 by Oklahoma State Regents for Higher Education.

the program increased substantially from 7,187 seniors in 2004 to 10,634 in 2012, a 48%

increase. The number of students that completed the program also grew from 5,081 to 6,874, a

35% increase. As indicated in Figure 3.2, the proportion of Oklahoma seniors participating in the

program from 2004 to 2012 grew from 18.9% to 27.2%, outpacing the growth of students

completing the program from 13.3% to 17.6%. For the 2013 graduating high school class, 6,364

out of the 9,649 students (66%) who initially enrolled in OK Promise successfully completed the

program.

Students who complete OK Promise attend a variety of institutions in the state of

Oklahoma. Figure 3.3 displays the distribution of students enrolled during the fall semester of

each year from 2004 to 2013 by institutional type. The most popular institutions were public

regional universities, which included 11 institutions. From 2004 to 2013, the percent of students
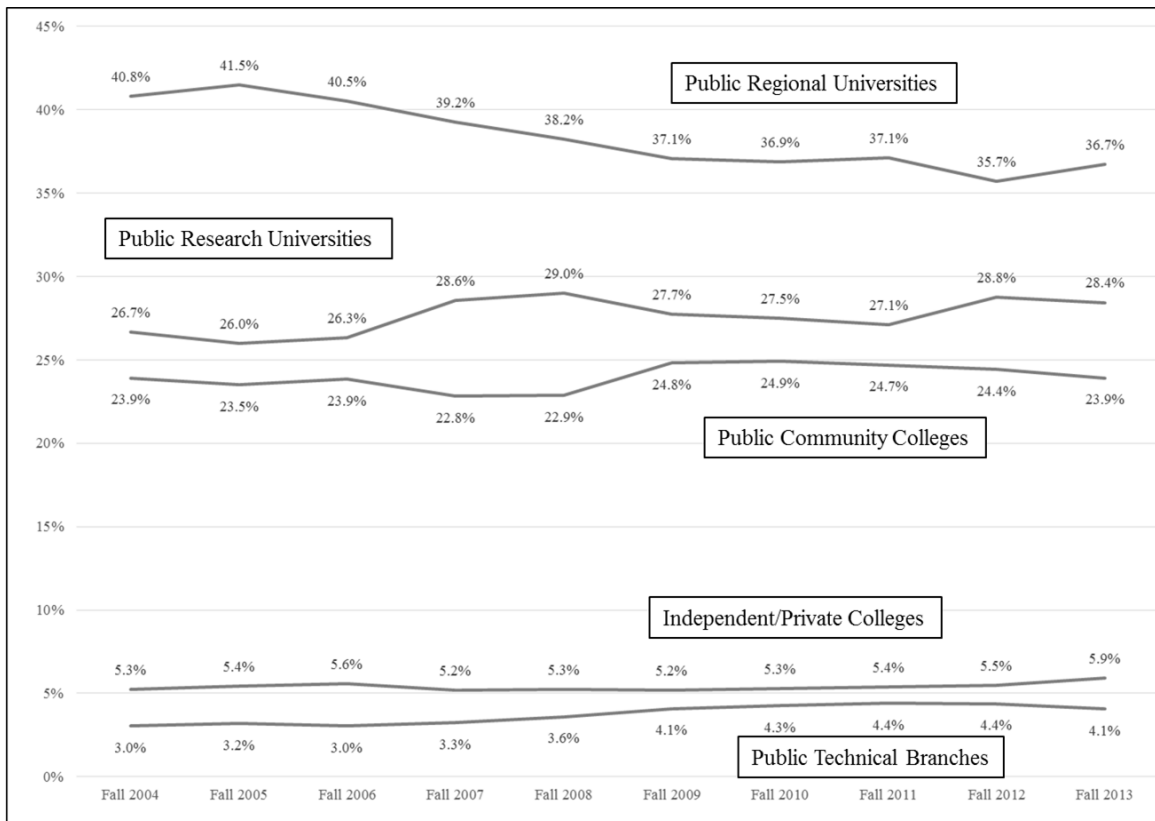
Figure 3.3. Percentage of Total Oklahoma's Promise Scholarship Students by Institution Type and Fall Semester. Adapted from *Oklahoma's Promise Year End Reports, 2004-2013.* Copyright 2016 Oklahoma State Regents for Higher Education.

enrolled at regional universities declined from 40.8% to 36.7%. The next most popular institutions were the two public research universities, the University of Oklahoma and Oklahoma State University, which grew slightly from 26.7% of all OK Promise students in 2004 to 28.4% in 2013. Students attending public community colleges represented 23.9% of all OK Promise students in 2004 and 23.9% in 2013 across 12 institutions. Public technical branches constituted 5.9% of OK Promise students in 2013 and private/independent colleges represented 4.1% of OK Promise students. Not shown were technology centers and proprietary institutions which each served less than 1% of OK Promise students.

Several factors about Oklahoma and OK Promise provided an interesting setting for this study. Despite relatively modest levels of personal income, the state maintains lower funding for education per student than most states, particularly at the K-12 level. Participation in higher education by students graduating from Oklahoma high schools also lags behind the national average. The state median family income also closely parallels the income threshold to participate in OK Promise. As Figures 3.1 and 3.2 demonstrate, participation rates in the program fall much lower than expected with only 27% of the graduating high school class in 2013 who initially enrolled by the end of their sophomore year of high school. Of those students who did sign up, roughly 1/3 of students in 2013 did not complete the final eligibility requirements. The widening gap in recent years between students who enroll in the program and those who complete it prompt additional questions about whether systemic factors play a role. Both the setting within the state of Oklahoma and the participation rates in OK Promise warrant further examination of the determinants of college choice associated with the program.

Research Design

Unit of Analysis

Public high schools represented the unit of analysis for this study. Broader frameworks such as Perna (2006a) suggest that policymakers and scholars should consider various aspects of student college choice beyond individual decision-making. Furthermore, this model suggests that

broader political, economic, and social factors are shaped by the context of the schools that students attend. Others, such as Rhoades (2014), argue that too much emphasis on individual students ignores broader political contexts and struggles that can shape the college choice landscape. Studies, such as Johnson (2008), that examine college choice using data aggregated at the high school level can help identify broader trends that can be used by practitioners. Although this study draws upon the existing framework of research on college choice centered on the individual student choice process, the emphasis on high school resources and demographic characteristics can help determine whether factors at the high school level influence the outcomes of public policy designed to encourage student participation in higher education.

Sample

The sample used in this study included public high schools in the state of Oklahoma over a ten year period, from the 2003-2004 academic year to the 2012-2013 academic year. For statistical purposes described later, only public high schools with graduating classes for every year of the study were included in the analysis.

Data Collection

This study analyzed data obtained from two sources. OSRHE provided data files that contained the annual number of high school seniors by high school (public and private) who enrolled in OK Promise and the number of high school seniors by high school who completed the program for each graduating cohort by academic year. OSRHE also supplied a separate data file that included the first postsecondary institution attended by graduating seniors who completed the program for each academic year. This data file included student-level records with the student's high school, graduation year, and the first postsecondary institution attended without any identifying information. This dataset was provided for the sole purpose of aggregating the results to the high school level. To ensure compliance regarding human subjects, a Determination of Non-Human Subjects form was submitted to Oklahoma State University's Office of University Research Compliance (URC) to evaluate whether the study needed Institutional Research Board

(IRB) approval. URC determined that the study did not qualify as human subjects research and a copy of their review is included in Appendix A. Data regarding high school graduating class sizes were obtained from publicly available datasets on OSRHE's website.

ODE's Office of Educational Quality and Accountability (OEQA) provided demographic and other high school-level data utilized in this study. OEQA annually collects and reports district and school report cards as a part of the Oklahoma Educational Indicators Program for every academic year. This comprehensive dataset includes dozens of data points for all public schools in the state that utilize data from the U.S. Census. It also includes the data collected by individual school districts that are reported to the state. Data from all sources were combined into one dataset by high school and academic year. Data were matched by the high school name, College Entrance Examination Board (CEEB) code, and a unique identifier assigned by ODE. The resulting dataset included only public high schools for each of the ten years covered in the study. Additional information about the final sample is reported in the next chapter.

Methods

This study tested each research question independently through separate regression models. The availability of longitudinal data for high schools by academic year necessitated the use of a fixed effects regression approach. Fixed effects models can be a useful tool when examining non-experimental data to account for unobserved variables and can help control for variation that occurs within the observation rather than comparing between observations (Allison, 2009). A fixed effects model also allows the researcher to evaluate all of the data in one model while accounting for change over time without completing separate regression models for each time period. Fixed effects models can also account for independent variables with variance across each time period. To address differences in school size, each of the dependent variables were calculated as proportions. Due to the nature of proportions being bound between values of 0 and 1, fractional probit and logit models were conducted for each of the research questions.

Fractional response models are described in greater detail in Chapter IV. All analysis for the study was conducted using Stata 14.

The study also utilized diagnostic tools prior to data analysis in order to identify any possible violations of the regression assumptions and to ensure the correct specification of the model. It examined descriptive statistics, correlation tables, and visual representations of the data in conjunction with other diagnostic tools to identify problems. It also examined other potential issues including outliers, multicollinearity among the independent variables, heteroscedasticity, and serial correlation among the observations due to the panel data which is discussed further in the next chapter.

Dependent Variables

Each of the three research questions represented relevant facets of the intersection between high schools, OK Promise, and college choice. The study used three different dependent variables to address these questions. The dependent variable for the first research question was the percentage of OK Promise students that completed the program that graduated from each Oklahoma public high school. This was calculated by dividing the number of students that completed the program by the overall graduating class size for that respective academic year. The dependent variable for the second research question was the proportion of students that completed the program requirements for OK Promise out of the total enrolled in OK Promise by high school. The dependent variable for the third question was the proportion of students that completed OK Promise and attended a public research university in the state of Oklahoma after graduation.

Independent Variables

To test each of the research questions, this study used a number of independent variables associated with school resources and characteristics within each separate model. The following section provides a brief description of each variable.

Ratio of Students to High School Staff. The role of high school resources remains a key theme in the literature to gauge high schools' ability to encourage college participation (see, for example, McDonough, 1997). The availability of trained counselors who assist students to prepare for college represents a critical resource at the high school level. This variable was measured by calculating the number of students in each high school divided by the number of full-time equivalent (FTE) counselors and teachers as reported by the OEQA school report for each academic year. This ratio was calculated using both teachers and counselors for two reasons. First, almost ¼ of schools reported a FTE value for counselors of zero, due in part to the small enrollment sizes for many schools in Oklahoma. However, Oklahoma statute requires a contact person for every high school for the OK Promise program and so teachers were included in this ratio to better reflect the relationship between staff and students as it related to the program.

Race/Ethnicity. The disparate participation of minority students in college and in merit aid programs also represents a recurring theme in the literature. To account for this, this study used a measure reported by OEQA that reports the ethnic makeup of each high school by race categories that include Caucasian, Black, Asian, Hispanic, and Native American. This measure calculated the percentage of non-Caucasian students in each high school reported by OEQA.

Socioeconomic Status. Similar to race and ethnicity considerations, socioeconomic status represents another important dynamic to consider at the high school level. This study utilized a value reported by OEQA that measures the percentage of students on free or reduced lunch. The federal government determines the eligibility for this program by considering family income and the number of individuals in the household. In 2013, the annual income limit for a family of four for reduced price meals and free meals was $42,643 and $29,965, respectively (U.S. Department of Agriculture, n.d.)

Parental Involvement. As mentioned previously, the role of parents and immediate family members has remained an important consideration in student participation in higher

70

education. This study used the percentage of parents who attended Parent-Teacher Conferences as a measure of parental involvement as reported by OEQA.

College-Going Rate. Scholars such as McDonough (1997) noted the role of peers in the choice process that results in a form of institutional habitus that can emerge from individual high schools. This study used a reported value from OEQA that reflected a lagged 3-year average of the reported college-going rate for each high school. For example, the 2013 dataset would look at a 3-year average of the college-going rate by high school from 2010 to 2012.

Academic Performance. The quality of the academic program and caliber of students can represent another mitigating factor to determine the effect of OK Promise. To evaluate this consistently across schools, this study used the average ACT score of the high school senior class as reported by OEQA.

Interaction Terms

Studies utilize interaction terms when the main effects of the independent variables are not additive and any analysis cannot interpret the effects without considering the effect of other variables (Cohen, Cohen, West, & Aiken, 2003). In this case, the college choice process literature has identified the close relationships among factors such as such as socioeconomic status and race. This study used an interaction term to measure the multiplicative effect of socioeconomic status and race.

Reliability and Validity

For our purposes, reliability refers to how well a form of a variable correlates with an alternative measure of the same variable. Validity, on the other hands, refers to whether the form of a variable actually measures what the researcher wants it to represent (Cohen, Cohen, West, & Aiken, 2003). Quantitative researchers should account for both of these important concepts in order to frame their research in the larger context of the literature and existing research. In the design of this study, the research topic on merit aid programs and high school factors represents one aspect of the college choice literature. This study achieved reliability and validity using

variables that fit within the larger context of the literature. For example, each of the independent variables represents concepts associated with the student college choice literature. To ensure validity, it used similar constructs of each variable framed within the existing literature.

Limitations of the Study

Examining a single program within a specific timeframe necessitates addressing specific limitations about the results of the study. First, this study only examined high school level effects on various aspects of student participation in OK Promise. Student-level effects were not evaluated and so results from this study should not be used to make generalizations about individual student participation. Second, due to the availability of data at the high school level, the study only included public high schools. Third, by selecting Oklahoma as a specific state, the study accounted for the structure and eligibility requirements of the OK Promise program that are quite different than merit aid programs in other states. Student requirements to sign up for the program before the end of their sophomore year of high school, limitations on family income, and high expectations for family and school involvement to complete the program provided a unique contextual setting that may be lost by looking at other states' programs. Although this study can advance the scholarship on merit aid programs and how they relate to college choice, care must be taken not to infer that the results would be indicative of other programs in other states. Finally, the study's focus was narrowed to a specific timeframe, from 2004 to 2013, due in part to changes in the eligibility criteria from $24,000 to $50,000 that were enacted in 2000 and 2001. The results of this study should not be used to make inferences about the program before or after the selected time period.

Summary

The preceding chapters identified the importance of examining the alignment of high school factors with participation rates in a state merit aid program. The emergence of models such as Perna's (2006a) identified the importance of high school factors on student college choice suggests that further research on this topic can progress the dialogue on the role of public policy

72

on participation in higher education. The research design of this study addressed this research gap by using a longitudinal quantitative approach to examine factors at the high school level and whether they affected policy outcomes in the forms of students participating in OK Promise. The characteristics of the state of Oklahoma and the OK Promise program also provided a useful setting to answer the research questions regarding student participation in a merit aid program and outcomes related to student college choice.

CHAPTER IV

RESULTS

The purpose of this study was to examine whether contextual factors at the high school level predicted participation rates and postsecondary attendance rates associated with a state financial aid program in the state of Oklahoma. This study addressed the following research questions:

1. Do contextual factors in Oklahoma public high schools, including school demographic characteristics, the staff to student ratio, the level of parental involvement, the college-going rate, and average ACT scores, affect the percentage of students by high school that participated in Oklahoma's Promise, a state hybrid aid program?

2. Do contextual factors in Oklahoma public high schools, including school demographic characteristics, the staff to student ratio, the level of parental involvement, the college-going rate, and average ACT scores, affect the completion percentage of students by high school enrolled in Oklahoma's Promise?

3. Do contextual factors in Oklahoma public high schools, including school demographic characteristics, the staff to student ratio, the level of parental involvement, the college-going rate, and average ACT scores, affect the percentage of students that completed Oklahoma's Promise and attended a public research university after graduation?

This chapter is organized to address the data analysis and results of this study. First, the study sample is described, including a review of the data collection process and descriptive information about the sample. Second, specifications and diagnostic information for the statistical models used to analyze the data are reviewed. Third, the results of the analysis are presented for each of the research questions.

Sample

The unit of analysis for this study was the public high school in Oklahoma. Data provided by the Oklahoma Department of Education (ODE) included all public schools in the state of Oklahoma on an annual basis for the academic years from 2004 to 2013. After combining this data into one file, the grade level reported by ODE was utilized to limit the sample to secondary schools with grade levels of either 11 or 12 which resulted in 468 high schools initially included in the study. 21 high schools that opened or closed during the timeframe of the study were eliminated to create a balanced panel dataset where every school had 10 years of data. Three other schools were eliminated due to the school not graduating a senior class during one or more years or due to insufficient data. Four schools were eliminate due to unusual school enrollment numbers for multiple years that did not match the school profile. The remaining 440 high schools constituted the final sample, with 4,400 observations over the 10-year period. Datasets with OK Promise participation and high school graduation class sizes were merged with the final sample to complete the dataset. High school graduation information was not available for five observations and this information was interpolated by examining the specific school and year that was missing and using values from adjacent years to complete the dataset.

Descriptive statistics were calculated for each of the dependent variables, independent variables, and other relevant variables that were used for calculation purposes. Table 4.1 presents the count, mean, standard deviation, median, minimum, maximum, and range for each variable for the 10-year pooled data. Individual results by academic year are also displayed in Appendix

B. The following discussion examines each of the variables in greater detail including a visual representation of the distribution for each variable.

Table 4.1

Descriptive Statistics for Study Sample

Factor	Variable	N	Mean	SD	Median	Min.	Max.	Range
Independent Variables	% Students on Free/Reduced Lunch	4398	0.546	0.19	0.546	0.018	1.0	0.018 - 1
	% Minority Students	4400	0.363	0.191	0.351	0	1	0 - 1
	% HS Seniors Attending Oklahoma College	4379	0.473	0.11	0.48	0.026	0.924	0.026 - 0.924
	% Parents Attending Teacher Conference	4243	0.50	0.246	0.48	0.00	1.00	0 - 1
	Average ACT of HS Seniors	4159	19.75	1.64	19.78	13.98	26.08	13.98 - 26.08
	Ratio of HS Counselors and Teachers to HS Student Population	4397	13.67	4.16	13.6	2.12	54.05	2.12 - 54.05
Dependent Variables	% of OKP Completers of HS Graduating Class	4400	0.216	0.12	0.2	0	1	0 - 1
	% of Enrollees that Completed OKP	4361	0.714	0.185	0.722	0	1	0 - 1
	% of OKP Completers Attending Research Univ.	4318	0.152	0.165	0.125	0	1	0 - 1
Related Variables	# of Students Enrolled in OKP	4400	19.95	22.85	12	0	264	0 - 264
	# of Students that Completed OKP	4400	13.38	14.05	9	0	165	0 - 165
	# of High School Graduates	4400	81.96	115.7	40	2	1068	2 - 1068

The first factor considered was the adjusted percentage of students on free or reduced lunch. The data provided by the state reported 52 observations with values over 100% suggesting that some schools may have over-reported the percentage of their students that qualified for free or reduced lunch. These values were set to 100% for the purposes of this study. This adjustment had almost no effect on the mean, median, and standard deviation of the original variable (0.547

mean; 0.546 median; 0.19 standard deviation). The unweighted mean of the adjusted variable

was 54.6%, comparable to the median value of 54.6%. School values ranged from 2% to 100%

of students on free and/or reduced lunch. Figure 4.1 displays the distribution of school

percentages with a relative normal distribution with almost no skewness (0.03).
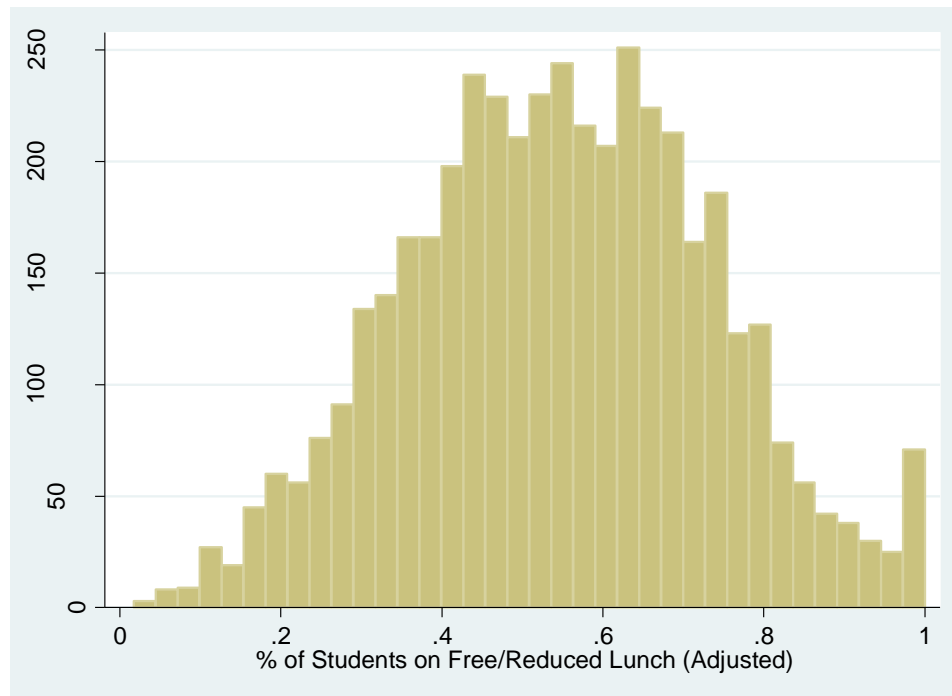
Figure 4.1 Distribution of Adjusted Percent of Students at HS on Free/Reduced Lunch. Skewness = 0.03;
Kurtosis = 2.65

The second factor was the percent of minority students at each school. This variable was

calculated by adding the reported percentages of each non-White student group by high school.

The unweighted mean by high school was 36% while the median value by school was 35%,

which were both slightly higher than the overall Oklahoma population. Values ranged from 0%

to 100% of the student population belonging to a minority group. However, Figure 4.2 shows the

distribution, with a positive skewness (0.62) which suggested that there were a number of schools

with higher percentages of minority students than the rest of the sample.
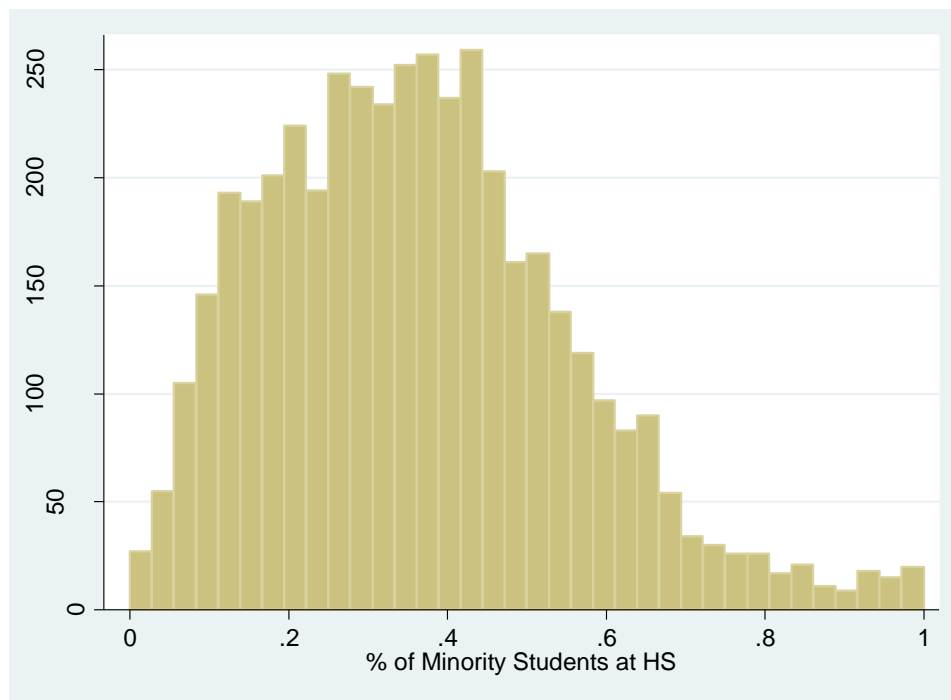
Figure 4.2 Distribution of Percent of Minority Students at High School. Skewness = 0.62; Kurtosis = 3.29

Another independent variable represented the percentage of seniors by high school who attended an Oklahoma college after graduation. This reported value by the state reflected an average of the percentage of students from the high school for the previous three academic years. The unweighted mean value was 47% and the median value was 48%. Individual school values ranged widely from 3% to 92% of students attending an Oklahoma college after graduation. The histogram in Figure 4.3 suggests a slight negative skewness (-0.30).

The next independent variable was the percentage of parents who attended at least one Parent-Teacher conference by high school as a measure of parental involvement at the high school level. The mean value was 50% with a median value of 48%. Values ranged by high school from 0% to 100% of parents attending teacher conferences. Figure 4.4 displays the distribution of this variable with a skewness of 0.17.
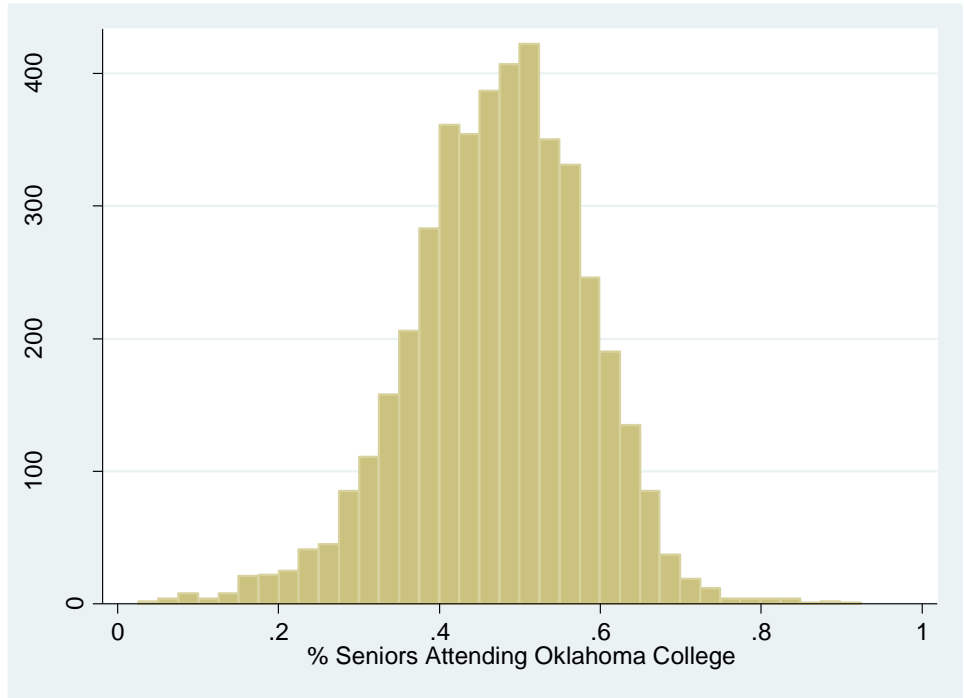
Figure 4.3 Distribution of Percent of HS Seniors Attending Oklahoma College. Skewness = -0.30; Kurtosis = 3.65
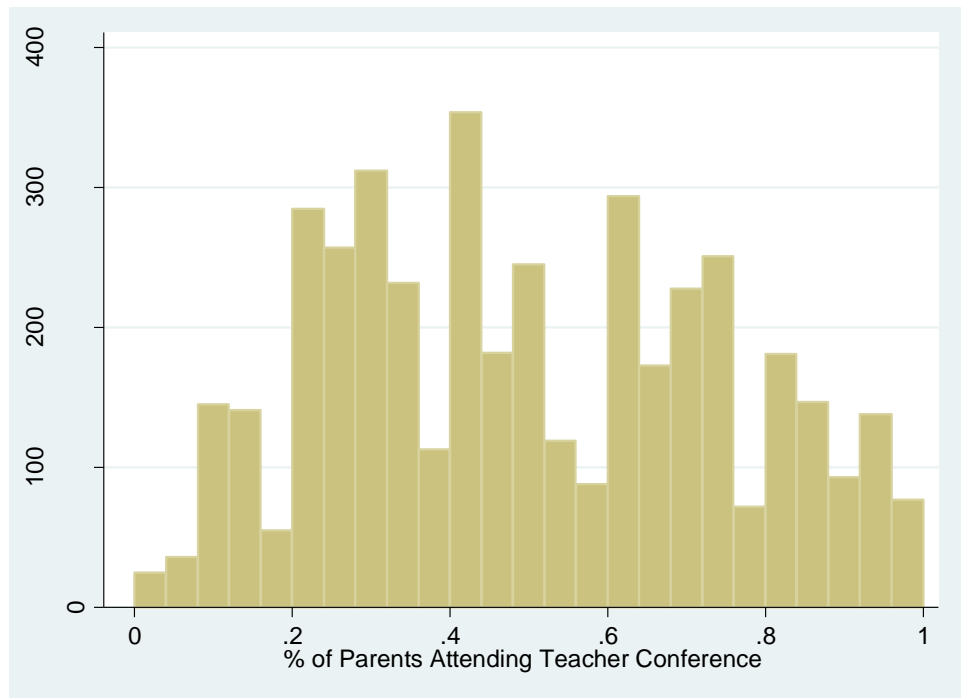
Figure 4.4 Distribution of Percent of Parents Attending Teacher Conference. Skewness = 0.17; Kurtosis = 2.00

Another independent variable was the average ACT score for the high school senior class. The mean value was 19.75 with a median value of 19.78. Scores ranged from 13.98 to 26.08 by school. The distribution of the variable reported in Figure 4.5 closely approximates a normal distribution with a slight negative skewness of -0.08.
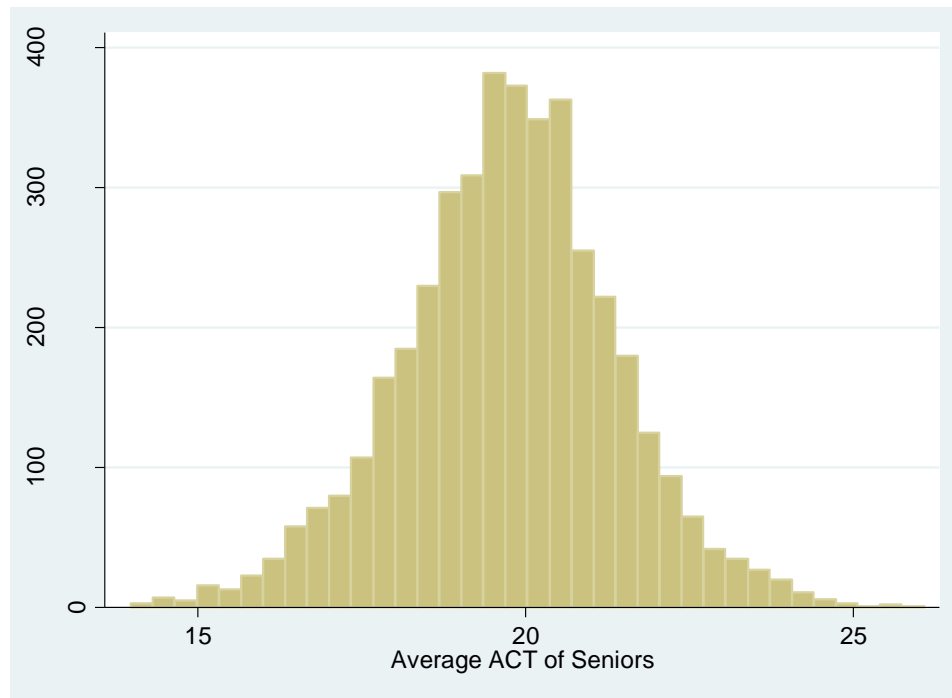
Figure 4.5 Distribution of Average Senior ACT Score. Skewness = -0.08; Kurtosis = 3.41

The next independent variable utilized for this study was the ratio of full-time counselors and high school staff to the total number of students enrolled at each public high school. Although the mean value of 13.67 students per staff member closely matched the median value of 13.6, the distribution was widely influenced by the presence of some significant outliers. These outliers are discussed later with the model diagnostics.
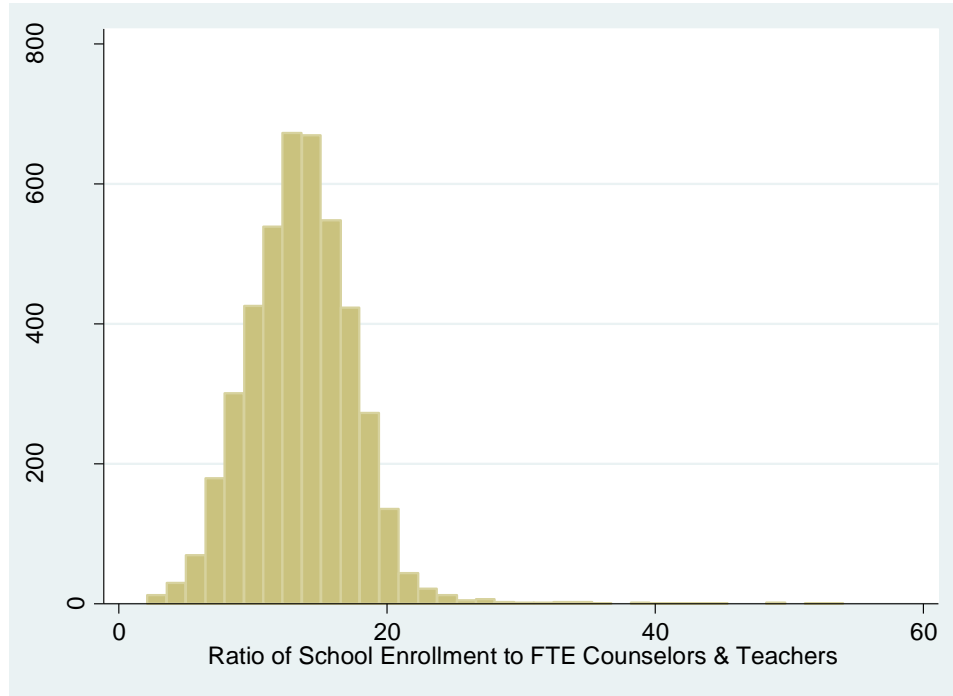
Figure 4.6 Distribution of Ratio of FTE Counselors & Teachers to School Enrollment. Skewness=1.34; Kurtosis=12.18
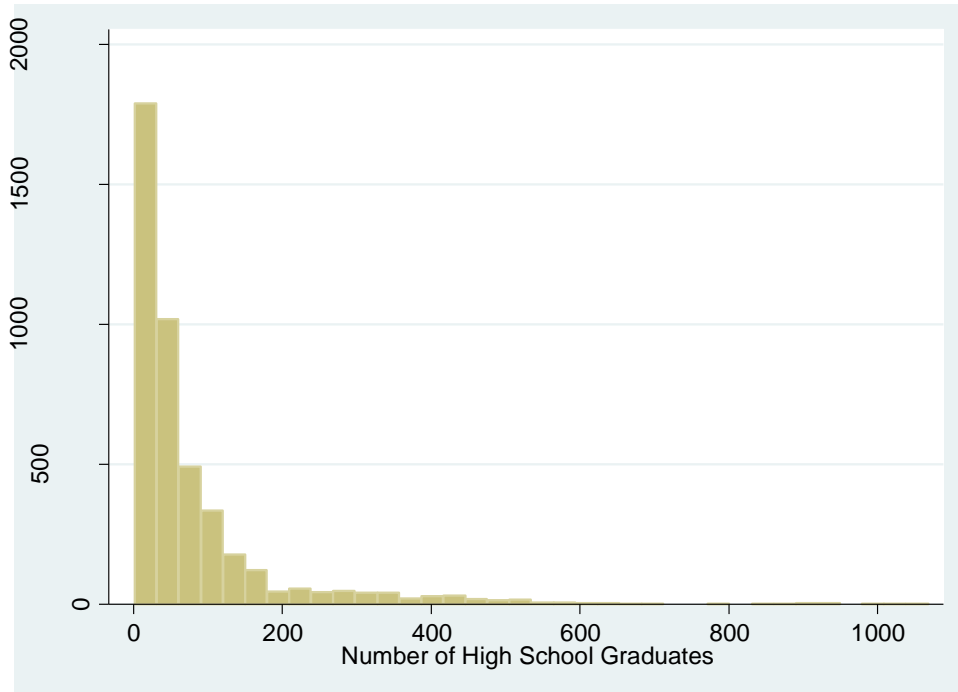
Figure 4.7 Distribution of Count of High School Graduates. Skewness= 3.53; Kurtosis= 19.69

Another relevant variable used to generate the dependent variable for the first research question was the number of high school graduates. The mean value was 81.96 with a median value of 40. Class sizes ranged from 2 to 1,068. Figure 4.7 displays the distribution of high school graduates by school, with a positive skewness of 3.53, suggesting that there are a few schools in the sample with much larger numbers of high school graduates than most of the other schools in the state.

The first dependent variable represented the percentage of the high school graduating class who completed OK Promise. This variable was calculated by dividing the number of OK Promise completers for each high school by the number of graduates. Values ranged from 0% to 100% of the class with a mean value of 22% and a median value of 20%. Figure 4.8 shows a relatively normal distribution with a slight positive skewness of 0.98, suggesting the presence of some schools with a high percentage of their graduating class who completed the program.
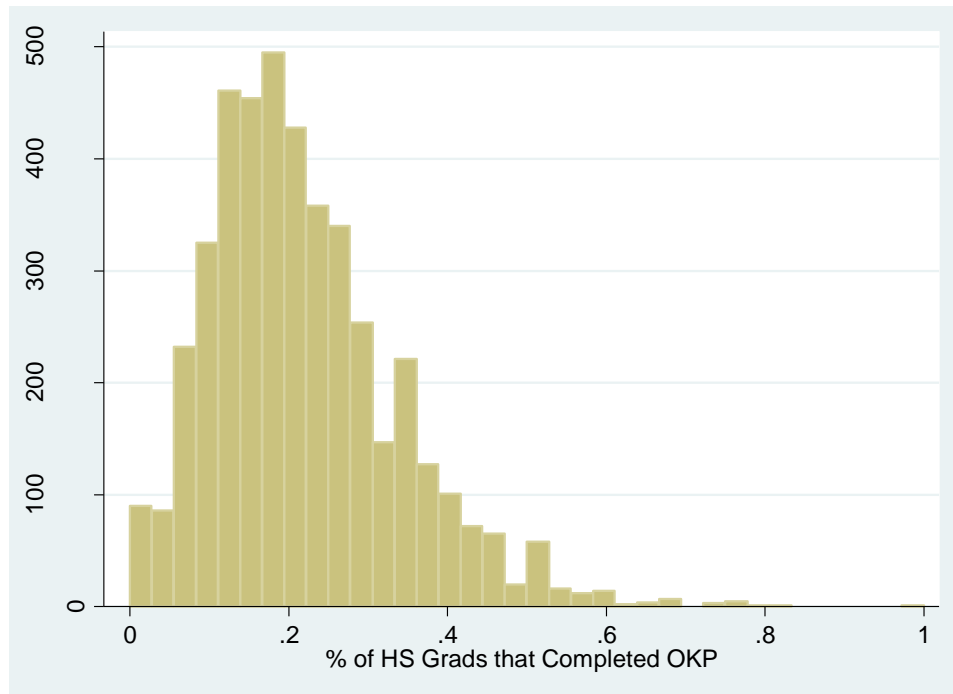
Figure 4.8 Distribution of Percent of High School Graduates that Completed OK Promise. Skewness=0.98; Kurtosis=4.70
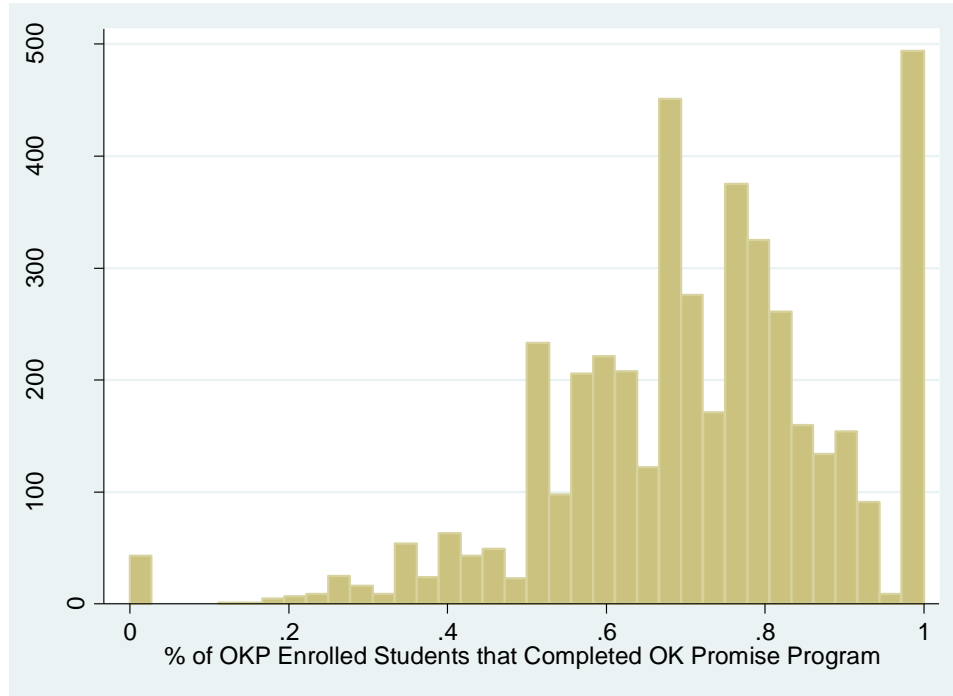
Figure 4.9 Distribution of Percent of Enrolled Students that Completed OK Promise Program. Skewness= -0.71; Kurtosis=4.31
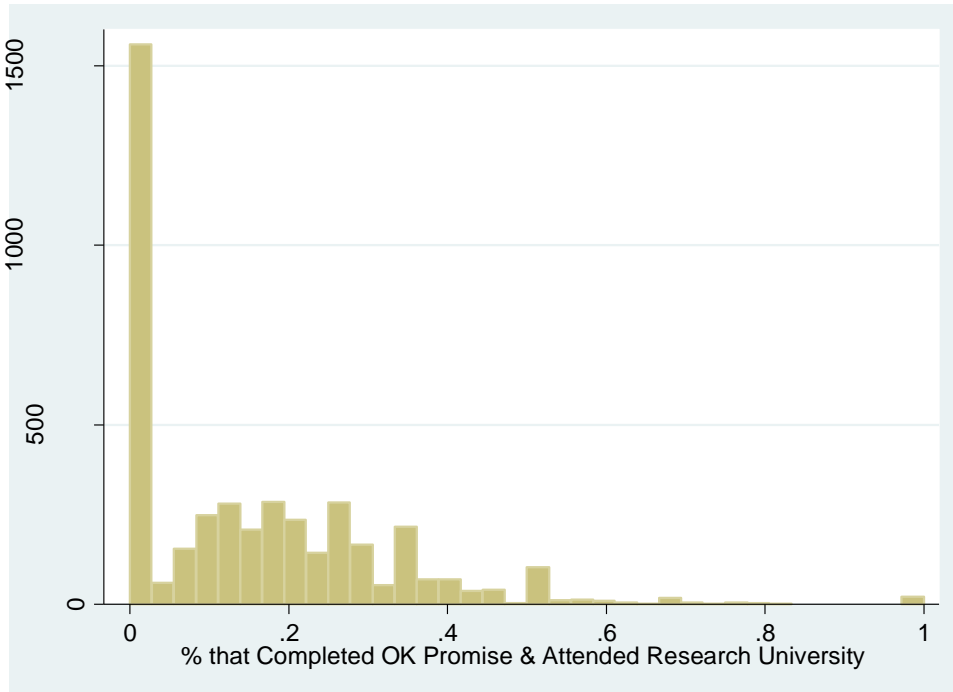
Figure 4.10 Distribution of Percent of Students that Completed OK Promise & Attended Research University. Skewness=1.44; Kurtosis=6.32

The second dependent variable represented the percentage of students in the senior class who enrolled in the OK Promise program and completed it. This variable was calculated by dividing the number of students that completed OK Promise by the number of students enrolled in the program during their senior year. The mean percentage of completion was 71% with a median value of 72%. Values ranged from 0% to 100%. Figure 4.9 includes the distribution with a slight negative skewness of -0.71.

The final dependent variable included the percentage of students that completed OK Promise and attended a public research university after high school graduation. This variable was determined by dividing the number of OK Promise completers who attended one of two public research universities in the state of Oklahoma by the number of OK Promise completers. The mean value was 15% with a median value of 13%. Values ranged from 0% of completers attending a public research university to 100%. The distribution displayed in Figure 4.10 shows that the majority of values clustered near zero, but the presence of some schools with greater percentages resulted in a positive skewness of 1.44.

Due to the nature of the sample and the use of panel data, it is also worth noting changes over variables included in the models over time. Table 4.2 displays the unweighted means and standard deviations for each of the dependent and independent variables for four selected years of the study. The mean value of students on free or reduced lunch increased from 51% in 2004 to 58.4% in 2013. The mean percentage of minority students shifted slightly from 33.4% to 36.6% in 2013. The mean percentage of high school seniors attending an Oklahoma college after graduation declined from 47.9% to 43.3% in 2013. The mean percentage of parents attending a teacher conference increased from 49.7% in 2004 to 53.3% in 2013. The average ACT score increased slightly from 19.7 to 19.88. The mean ratio of students to high school staff increased slightly from 13.16 to 13.69.

Table 4.2

Means and Standard Deviations for Key Variables, Selected Years

	2004		2007		2010		2013	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
% Students on Free/Reduced Lunch	0.510	0.199	0.528	0.187	0.557	0.181	0.584	0.183
% Minority Students	0.334	0.189	0.363	0.192	0.384	0.192	0.366	0.187
% HS Seniors Attending Oklahoma College	0.479	0.112	0.492	0.106	0.472	0.112	0.433	0.105
% Parents Attending Teacher Conference	0.497	0.255	0.488	0.238	0.491	0.247	0.533	0.243
Average ACT of HS Seniors	19.70	1.54	19.73	1.68	19.74	1.73	19.88	1.66
Ratio of HS Counselors and Teachers to HS Student Population	13.16	4.21	13.97	4.72	13.43	4.26	13.69	3.76
% of OKP Completers of HS Graduating Class	0.192	0.116	0.222	0.122	0.218	0.111	0.215	0.105
% of Enrollees that Completed OKP	0.717	0.191	0.698	0.192	0.715	0.188	0.710	0.182
% of OKP Completers Attending Research Univ.	0.161	0.173	0.190	0.184	0.143	0.155	0.129	0.149

Box plots of the distributions for each of the dependent variables are included by year in Figures 14.11, 14.12, and 14.13, respectively. This visual representation was useful to note that the values for each of the dependent variables vary slightly from year to year. Over the range of the study, the percentage of students that completed OK Promise of each graduating class increased slightly from 19.2% in 2004 to 21.5% in 2013. The presence of outliers at the top end of the range suggests a positive skew. The percentage of students enrolled in OK Promise that completed the program declined slightly from 71.7% in 2004 to 71.0% in 2013 with a slight negative skew. The percentage of OK Promise students that completed the program and attended a public research university declined from 16.1% in 2004 to 12.9% in 2013 with the results bound at zero on the lower end of the range.
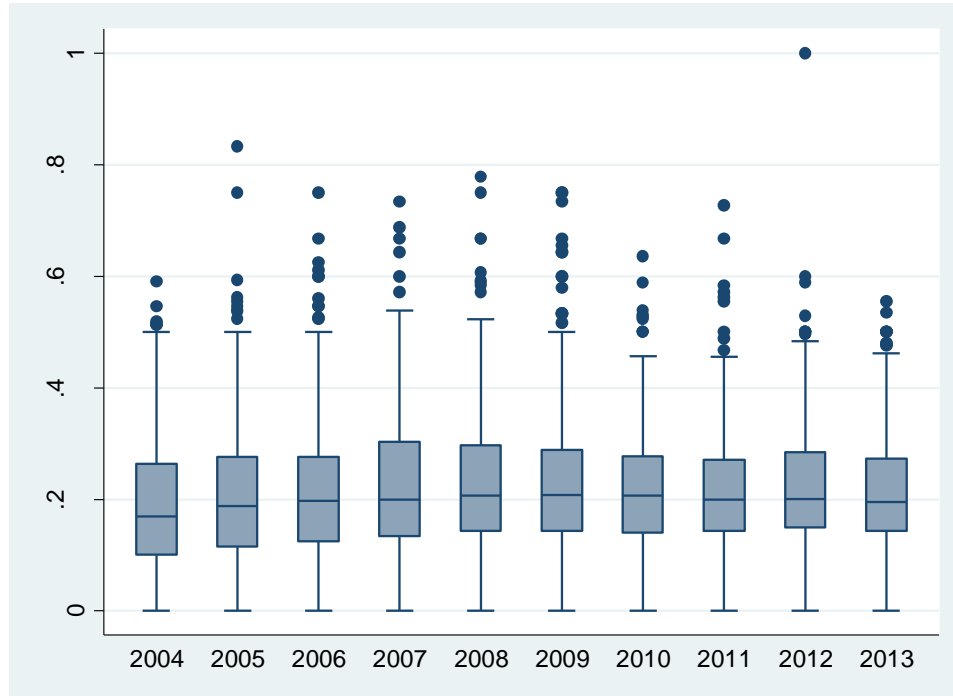
Figure 4.11. Box plots of Percent of High School Graduates that Completed OK Promise by Year.
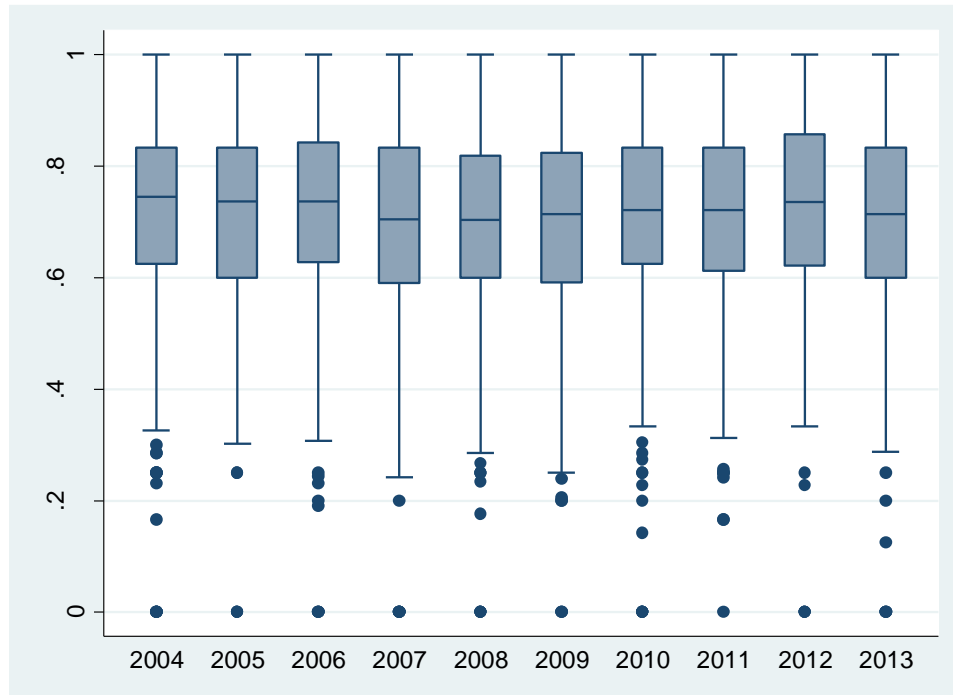
Figure 4.12. Box plots of Percent of Enrolled Students that Completed OK Promise Program by Year.

86
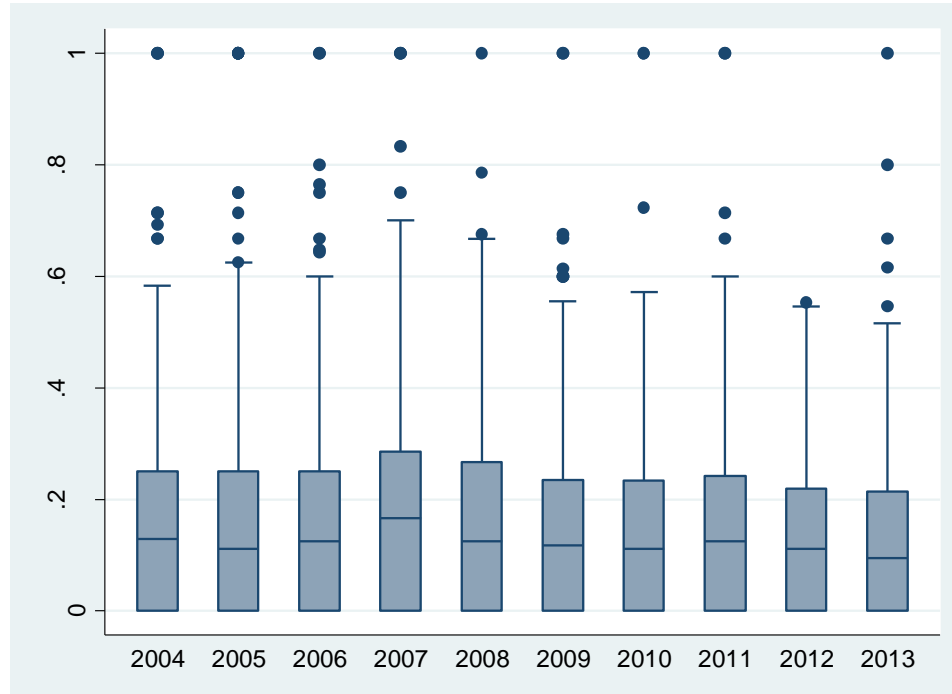
Figure 4.13. Box plots of Students that Completed OK Promise & Attended a Public Research University by Year.

Model Specification

Each research question examined whether high school factors predicted outcomes associated with OK Promise expressed as percentages of students by high school. The use of proportional variables where the responses are bounded from 0 to 1 necessitated the use of specific statistical models rather than traditional multivariate OLS models because the OLS regression analysis could produce predicted values above and below the range of the dependent variable. Despite this limitation, the use of fractional or percentage responses has gained increasing attention in a number of different areas, including K-12 education research, due to attention from policymakers on how school performance is measured (Papke & Wooldridge, 2008). Another challenge was utilizing a panel dataset that included multiple years of data for the same observations. Statistical packages such as Stata offer separate models that can produce results either for fractional responses or longitudinal data but not both aspects together in the same model. To remedy this, Papke and Wooldridge (2008) developed a widely cited method to

87

account for both fractional responses and panel datasets. In their analysis of 4th grade math test scores by individual school districts in the state of Illinois, they used a general linear model with a probit link function and then included other appropriate controls for utilizing a fixed effects approach for longitudinal data that included variables representing the time average for each of the main independent variables and dummy variables for each year. Their results were then clustered by school district to account for variance across districts.

A fixed effects approach for each research question was appropriate for this study. Fixed effects models control for potential omitted variable bias in random effects models by focusing on variance within an observation across years rather than variance between observations that can be confounded by omitted variables that do not vary over time (Allison, 2009). Fixed effect models typically produce results with larger reported standard errors (Allison, 2009). However one potential concern is whether there is sufficient variation within individual observations over time. Allison (2009) noted that "[i]f predictor variables vary greatly across individuals but have little variation over time for each individual, then fixed effects estimates will be very imprecise" (p. 3). Tests such as Hausman, which compares a linear regression model with fixed effects against a linear model with random effects to determine the correct model, can be conducted to determine whether to use a fixed effects or random effects approach (Williams, 2015). For this study, a Hausman test was conducted during the preliminary stages of the study prior to imputation and it was determined that a fixed effects approach was correct. A post-hoc Hausman was conducted after the use of imputation for missing data and the results changed somewhat, with the Hausman signifying issues with using a fixed effects for the second research question. This issue will be addressed further later in this chapter.

Each research question addressed in this study required a similar model to examine the proportional response variable with longitudinal data. To do so, a fractional probit regression model was utilized that replicated the steps taken by Papke and Wooldridge (2008). Time average variables were generated for each independent variable and dummy variables for each

88

year were included. Due to enhancements in the latest version of Stata, percentage responses in the dependent variable were modeled using a fractional response probit model rather than the general linear model estimates utilized by Papke and Wooldridge that produced identical results to their original estimates.

One of the challenges associated with using the fractional probit model was a matter of interpreting the results because probit models produce coefficients based on z-scores rather than the coefficients in OLS and logit models that can be easier to interpret their direct effects on the dependent variable. Furthermore, some scholars, such as Power and Xie (2006), argue that the distributions from a probit model versus a logit model are so similar that it is a matter of preference to choose a specific one. However, one of the benefits of a logit model is that the results can be displayed in odds ratios to make interpretation of the results easier to understand. Papke and Wooldrige (2008) displayed results from three different estimates, including a linear fixed effects model and two different probit models. In the analysis section of this chapter, results are displayed for a fixed effects OLS linear model, the fractional probit, and the fractional logit for comparison across models.

Alternatively, the results from the fractional probit model can be interpreted by looking at the marginal effects of the independent variables. The nonlinear nature of probit and logit models means that the effects of any independent variable are not constant and can change across the model. Marginal effects can be used to represent the effects of the independent variables at certain points. Due to the nature of fractional models, one suggested method of reporting the marginal effects is to examine the average marginal effects of each of the key independent variables expressed as the derivative with elasticity in relation to the independent variable (Stata, n. d.). This method allows the marginal effect to be interpreted as a percentage increase in the dependent variable caused by a 1% change in the independent variable if the rate were held constant (Stata, n.d.). Due to some of the limitations using imputed data, creating the marginal effects in Stata relies upon creating linear predictions.

Model Diagnostics

Several steps were taken to address any potential issues with the study sample prior to data analysis. The following section reviews the results of the diagnostics performed on the study sample to ensure the accuracy of each model.

Collinearity

One key assumption of the models used in this study is that the independent variables are not highly correlated with each other. Table 4.3 presents a correlation matrix among each of the independent variables. In almost all cases, the correlation was statistically significant. Further analysis of these correlations included conducting a simple OLS regression and then estimating the variance influence factor (VIF) scores for each independent variable that is reported in Table 4.4. Values over 10 suggest the potential for multicollinearity among the independent variables. For this study, no VIF factor was greater than 2 and so it does not appear that multicollinearity was an issue.

Table 4.3

Bivariate Correlation Matrix for Independent Variables

Variable	PercentFree Lunch	Percent Minority	PercentOK College	PercentParent TeacherConf	AvgSenior ACT	RatioStaff ToStudent
PercentFreeLunch	1.00					
PercentMinority	0.4922**	1.00				
PercentOKCollege	-0.3906**	-0.2135**	1.00			
PercentParentTeacherConf	-0.0898**	-0.0903**	0.1180**	1.00		
AvgSeniorACT	-0.5970**	-0.4222**	0.3537**	0.1103**	1.00	
RatioStaffToStudent	-0.1845**	0.1670**	-0.0622**	-0.0685**	0.1707**	1.00

**p<0.01

Table 4.4

Variance Inflation Factors (VIF) for Independent Variables

Variable	VIF
PercentFreeLunch	1.97
PercentMinority	1.69
PercentOKCollege	1.55
PercentParentTeacherConf	1.23
AvgSeniorACT	1.16
RatioStaffToStudent	1.03
Mean VIF	1.44

Heteroscedasticity and Serial Correlation

Two other key assumptions were tested to ensure that the correct specification of the model. First, linear regression assumes homoscedasticity or constant variance across observations. To test for this with the study sample, the Breusch-Pagan/Cook-Weisberg test for heteroscedasticity was conducted by running separate OLS regression models for each of the dependent variables and specified independent variables. This post-estimation test conducts a chi-square test with the null hypothesis assuming constant variance. For each of the three tests, significant results indicated the presence of heteroscedasticity in the sample. Similar to the issue of heteroscedasticity, the use of panel data with multiple observations over a period of time can lead to serial correlation among observations that results in biased standard errors. The Wooldridge test for auto-correlation was utilized for each of the research questions. The Wooldridge test found evidence of auto-correlation with the first model that examined the percentage of high school graduates who completed OK Promise while the other two models did not display auto-correlation results. The remedy for possible issues of heteroscedasticity and serial correlation include generating robust standard errors or clustering observations while running the analysis. Observations were clustered by high school to address these issues.

Missing Data

Due to the specifications of the chosen models for this analysis, it was important to identify any missing data and determine the best method to estimate the results with a complete dataset for each school over the ten-year period. Table 4.5 displays the number of observations for each of the independent variables that were missing values. Roughly 9.5% of observations of the total sample were missing at least one independent variable. Software packages such as Stata utilize listwise deletion of any observations missing data in the independent variables, which would decrease the statistical power of the analysis. Furthermore, scholars such as Allison (2009) advocate for utilizing balanced datasets that include complete values for each year. 165 schools, or 38% of the total sample, were missing at least one data point for the independent variables across the sample period, which made eliminating any school with any data missing over the 10-year period unrealistic. The use of a fixed effects panel approach with the statistical models made it imperative to account for any missing data.

Table 4.5

Missing Data for Independent Variables

Variable	Count of Missing Data
PercentFreeLunch	2
PercentMinority	0
PercentOKCollege	21
PercentParentTeacherConf	157
AvgSeniorACT	241
RatioStaffToStudent	3
Total Missing Data Points	424
Total Observations Missing at Least 1 Variable	400

To remedy this issue, multiple imputation was utilized to generate estimated values for missing data based on the available data in the rest of the sample. Multiple imputation creates multiple estimated values for each missing data point after a set number of estimates and then

pools the results into one model during the actual analysis (Humphries, n.d.). For this study, the number of imputations was set to 10 and data were imputed in long form due to the number of schools and years being studied along with the number of independent variables used to generate each estimate. One measure of the effect of imputation is the relative variance increase (RVI) which calculates "the increase in the variance of the estimate because of the loss of information due to nonresponse relative to the variance of the estimate with no information lost" (Stata n.d., p. 8). Values closer to zero demonstrate less of an effect on the model (Stata, n.d.). The RVI values of the nine models estimated for this study ranged from 0.0089 to 0.0204, suggesting a small effect.

Outliers

Several methods were used to identify potential outliers. Descriptive statistics, graphs and visual representation, and inspecting the high and low values for each independent variable were utilized to identify potential outliers in the dataset. DFBETA estimate were calculated prior to imputation for each independent variable as a post-test estimate. This value can be useful to determine the influence of removing an observation on the coefficient of the independent variable (Williams, 2015). Extreme high and low values for each DFBETA value were compared across each of the independent variables to determine whether there were observations affecting multiple independent variables.

The results from the DFBETA comparison identified that most of the source of outlier influence was from one independent variable, the ratio of staff to students based on the number of FTE counselors and high school teachers to the overall school population, proved particularly troublesome. For example, during the initial data exploration, it was discovered that 911 observations over the ten-year period reported a FTE of 0 for high school counselors. The vast majority of these were reported for schools with smaller enrollments. However, state statute requires that every high school have at least one high school counselor or teacher to serve as a contact person for OK Promise. To account for this, a new variable was created that combined

teacher and counselor FTE in order to calculate the ratio value. Despite this step taken to better

account for actual school support, an initial examination of the new variable found many schools

with large ratios. For these cases, individual schools were examined to determine if it was a data

entry error on the part of the school when looking at the ratios for other years. One value was

replaced as missing and three values were replaced with the correct value after it was apparent

that they were reported incorrectly. Four schools were excluded from the final sample due to

unusually high enrollment over multiple years that did not match the profile of the school or the

community it served.

Post-Hoc Diagnostics

As mentioned previously, fixed effects models typically report results with larger

standard errors due to the emphasis of the models on variance within observations across time

rather than accounting for variance between observations (Allison, 2009). One potential concern

is that the coefficients from a fixed effects approach can vary significantly from the significance

of the coefficients using traditional regression approaches. In this case, Allison (2009) noted

potential issues:

> Whenever conventional regression produces a significant coefficient but fixed effects
>
> regression does not, there are two possible explanations: (a) The fixed effects coefficient
>
> is substantially smaller in magnitude and/or (b) the fixed effects standard error is
>
> substantially larger (p. 9).

To account for this, conventional fractional probit models were conducted by individual year for

each research question after the fixed effects models were run to compare. For all three research

questions, several coefficients varied significantly between the fixed effects and conventional

models, suggesting potential issues with the coefficients for the fixed effects models. The results

of both models are reported in the following sections. The discrepancy between models also

necessitates further discussion in the next chapter about potential limitations with the use of fixed

effects models and variation within schools over the timeframe of the study.

Analysis

Research Question #1

The first research question examined whether factors at the high school level affected the percentage of high school graduates who completed the OK Promise program. Three separate regression approaches were conducted that examined the panel data using a fixed effects model, a fractional probit model, and a fractional logit model. Each model included the specified independent variables, a variable representing the time average of each independent variable, and dummy variables for each year of the study. Observations were clustered by school. The results presented in Table 4.6 display the primary independent variables with the control variables omitted. Statistically significant results are reported at an alpha level of 0.05 unless otherwise noted. The full models are available in Appendix C. The theoretical prediction model can be expressed as follows:

$$OKPCompletePercent = PercentFreeLunch + PercentMinority + PercentFreelunch*PercentMinority + PercentOKCollege + PercentParentTeacherConf + RatioStaffToStudent$$

Panel results. In all three models, the interaction between the percent of students on free/reduced lunch and the percent of minority students was not statistically significant. Individual effects for these variables were also not statistically significant. Other independent variables, including the percent of parents attending at least one teacher conference, the percent of students attending an Oklahoma college after graduation, the average ACT score, and the ratio of staff to students were not statistically significant. Despite the lack of significant individual coefficients, the F-test for the fractional probit model was tatistically significant (F[23,541983.7] = 11.75,p<0.000) and also significant for the other two models. Although multiple imputation models do not report goodness of fit results, individual imputation estimates do report either the R-squared or the pseudo R-squared value

95

Table 4.6

Fractional Regression Analysis- Percentage of High School Graduates that Completed OK Promise

Model	Variables	Coefficient	Std. Error	T-Score	P-Value
	PercentFreeLunch	-0.003	0.173	-0.020	0.984
	PercentMinority	-0.306	0.252	-1.210	0.225
	PercentFreeLunch X PercentMinority	0.576	0.423	1.360	0.172
	PercentOKCollege	0.074	0.110	0.670	0.504
Fractional Probit	PercentParentTeacherConf	0.030	0.034	0.890	0.375
	AvgSeniorACT	0.010	0.007	1.360	0.177
	RatioStaffToStudent	-0.005	0.004	-1.220	0.224
	Intercept	-0.681	0.281	-2.420	0.015
	$F_{(23,541983.7)} = 11.75, p<0.000$				
	PercentFreeLunch	-0.010	0.299	-0.030	0.974
	PercentMinority	-0.530	0.440	-1.200	0.229
	PercentFreeLunch X PercentMinority	1.000	0.733	1.360	0.173
	PercentOKCollege	0.125	0.191	0.650	0.513
Fractional Logit	PercentParentTeacherConf	0.052	0.060	0.860	0.387
	AvgSeniorACT	0.017	0.013	1.350	0.178
	RatioStaffToStudent	-0.008	0.008	-1.100	0.273
	Intercept	-1.087	0.487	-2.230	0.026
	$F_{(23,470417.3)} = 11.45, p<0.000$				
	PercentFreeLunch	-0.008	0.052	-0.150	0.880
	PercentMinority	-0.098	0.073	-1.340	0.180
	PercentFreeLunch X PercentMinority	0.183	0.126	1.450	0.148
	PercentOKCollege	0.021	0.033	0.650	0.518
Linear (Fixed Effects)	PercentParentTeacherConf	0.009	0.010	0.890	0.374
	AvgSeniorACT	0.003	0.002	1.340	0.184
	RatioStaffToStudent	-0.001	0.001	-1.220	0.223
	Intercept	0.232	0.082	2.850	0.005
	$F_{(23, 436.6)} = 11.80, p<0.000$				

n=4,400.

for each respective model. The R-squared values for individual imputations for the linear model ranged from 0.1886 to 0.1904 and the pseudo R-squared ranged from 0.0149 to 0.0151 for the probit and logit models.

As previously mentioned, interpreting probit coefficients can be challenging. The results from the linear fixed effects and fractional logit model are displayed as an approximation of the effect of the significant effects. For example, using the linear fixed effects approach, a one unit increase in the ratio of staff to students decreased the proportion by 0.001, or 0.1%. Increasing the ratio by 10 would decrease the percentage of OK Promise completers by 1%. Alternatively,

Table 4.7 reports the average marginal effects with elasticity from the fractional probit model that translates a 1%-change in the independent variable to a unit change in the dependent variable to make comparisons easier. However, no coefficients were statistically significant.

Table 4.7

Average Marginal Effects with Elasticity for Fractional Probit Model- Percentage of High School Graduates that Completed OK Promise

Variable	Dy/Ex	Std. Error
PercentFreeLunch	-0.002	0.094
PercentMinority	-0.111	0.092
PercentFreeLunch X PercentMinority	0.125	0.091
PercentOKCollege	0.035	0.052
PercentParentTeacherConf	0.015	0.017
AvgSeniorACT	0.199	0.147
RatioStaffToStudent	-0.070	0.058

Individual year results. Fractional probit models were conducted for each individual year as a baseline comparison against the fixed effects results. These models did not include control variables for fixed effects due to examining individual years. Results are displayed below for four years across the range of the study: 2004, 2007, 2010, and 2013 in Table 4.8 along with the average marginal effects with elasticity for each independent variable. Full results for each year are also reported in Appendix D.

For the four selected years, the interaction between the percent of minority students and the percent of students on free/reduced lunch was not statistically significant. Without the interaction's significance, the percent on free/reduced lunch was statistically significant in 2004, 2007, and 2013. The percent of students at the high school from the three previous years attending an Oklahoma college was significant for each year except 2013, suggesting a positive relationship. The percent of parents attending a teacher conference and the average ACT score were not statistically significant. The ratio of staff to students was statistically significant and negative.

Table 4.8

Fractional Probit Models for Individual Years - Percentage of High School Graduates that Completed OK Promise

Year	Variable	Coefficient	Std. Error	T-Score	P-Value	Dy/Ex	Std. Error
			Model Results			Average Marginal Effect	
	PercentFreeLunch	0.564	0.174	3.240	0.001	0.287	0.089
	PercentMinority	0.310	0.303	1.020	0.306	0.104	0.101
	PercentFreeLunch*PercentMinority	-0.631	0.452	-1.400	0.162	-0.118	0.084
	PercentOKCollege	0.730	0.182	4.010	0.000	0.350	0.087
2004	PercentParentTeacherConf	0.057	0.079	0.720	0.471	0.028	0.039
	AvgSeniorACT	-0.005	0.015	-0.360	0.717	-0.105	0.288
	RatioStaffToStudent	-0.040	0.006	-7.140	0.000	-0.527	0.074
	Intercept	-0.912	0.319	-2.860	0.004		
	F(7,129011.4) = 22.13,p<0.000						
	PercentFreeLunch	0.771	0.239	3.230	0.001	0.407	0.126
	PercentMinority	0.160	0.280	0.570	0.566	0.058	0.101
	PercentFreeLunch*PercentMinority	-0.578	0.474	-1.220	0.222	-0.121	0.099
	PercentOKCollege	0.639	0.216	2.950	0.003	0.314	0.106
2007	PercentParentTeacherConf	0.079	0.087	0.910	0.363	0.039	0.042
	AvgSeniorACT	0.005	0.017	0.290	0.770	0.096	0.327
	RatioStaffToStudent	-0.024	0.006	-3.910	0.000	-0.331	0.085
	Intercept	-1.235	0.367	-3.360	0.001		
	F(7,14058.1) = 6.29,p<0.000						
	PercentFreeLunch	0.371	0.229	1.620	0.105	0.207	0.128
	PercentMinority	-0.263	0.318	-0.830	0.408	-0.101	0.122
	PercentFreeLunch*PercentMinority	0.265	0.455	0.580	0.560	0.062	0.106
	PercentOKCollege	0.490	0.178	2.760	0.006	0.231	0.084
2010	PercentParentTeacherConf	0.010	0.075	0.140	0.890	0.005	0.037
	AvgSeniorACT	-0.016	0.017	-0.920	0.356	-0.308	0.334
	RatioStaffToStudent	-0.017	0.008	-2.160	0.030	-0.230	0.106
	Intercept	-0.650	0.380	-1.710	0.088		
	F(7,143536.2) = 6.06,p<0.000						
	PercentFreeLunch	0.525	0.224	2.340	0.019	0.306	0.131
	PercentMinority	-0.024	0.344	-0.070	0.944	-0.009	0.126
	PercentFreeLunch*PercentMinority	0.140	0.512	0.270	0.784	0.033	0.119
	PercentOKCollege	0.252	0.190	1.330	0.185	0.109	0.082
2013	PercentParentTeacherConf	-0.002	0.064	-0.030	0.975	-0.001	0.034
	AvgSeniorACT	0.004	0.015	0.270	0.788	0.079	0.293
	RatioStaffToStudent	-0.021	0.006	-3.880	0.000	-0.294	0.076
	Intercept	-1.020	0.318	-3.200	0.001		
	F(7,389325.3) = 11.10,p<0.000						

Interpreting the coefficients with elasticity from the individual fractional probit models suggest some interesting trends. A 1% increase in students on free/reduced lunch suggested a 0.287 increase in students completing the OK Promise program in 2004 and a 0.306 increase in 2013. A 1% increase in the Oklahoma college-going rate would reflect a 0.35 increase in 2004 and a 0.231 increase in 2010. A 1% increase in the ratio of high school staff to students resulted in a 0.527 decrease in 2004 and a 0.294 decrease in 2013.

98

Research Question #2

The second research question examined whether factors at the high school level affected the completion percentage of students enrolled in the OK Promise program. Similar to the first research question, three separate regression approaches were conducted that examined the panel data using a linear fixed effects model, a fractional probit model, and a fractional logit model. Table 4.9 presents the results with the control variables omitted. The full model is available in Appendix C. The theoretical prediction model can be expressed as follows:

$$OKPCompleteRate = PercentFreeLunch + PercentMinority + PercentFreelunch*PercentMinority +$$
$$PercentOKCollege + PercentParentTeacherConf + RatioStaffToStudent$$

Panel results. In this model, the interaction between the percent of students on free/reduced lunch and the percent of minority students was not statistically significant. The individual variables were also not statistically significant. Variables representing the percent of parents attending at least one teacher conference, the percent of students attending an Oklahoma college after graduation, and the ratio of staff to students, were not statistically significant. The average Senior ACT Score was statistically significant and positive for all three models. The F-test was statistically significant for the probit model (F[23,990778.8]=7.66,p<0.000) and both of the other models. R-Square values for the linear model ranged from 0.0857 to 0.0874 for each imputation. Pseudo R-Square values ranged from 0.0118 to 0.0120 for both the probit and logit models.

99

Table 4.9

Fractional Regression Analysis - Percentage of OK Promise Enrolled Students that Completed Program

Model	Variables	Coefficient	Std. Error	T-Score	P-Value
	PercentFreeLunch	-0.114	0.223	-0.510	0.610
	PercentMinority	-0.102	0.322	-0.320	0.752
	PercentFreeLunch X PercentMinority	-0.084	0.505	-0.170	0.867
	PercentOKCollege	-0.132	0.159	-0.840	0.403
Fractional Probit	PercentParentTeacherConf	0.033	0.047	0.720	0.475
	AvgSeniorACT	0.025	0.011	2.310	0.022
	RatioStaffToStudent	-0.007	0.004	-1.700	0.090
	Intercept	0.714	0.337	2.120	0.034
	F(23,990778.8) = 7.66, p<0.000				
	PercentFreeLunch	-0.189	0.373	-0.510	0.612
	PercentMinority	-0.175	0.536	-0.330	0.744
	PercentFreeLunch X PercentMinority	-0.141	0.836	-0.170	0.866
	PercentOKCollege	-0.215	0.264	-0.820	0.414
Fractional Logit	PercentParentTeacherConf	0.054	0.077	0.700	0.485
	AvgSeniorACT	0.041	0.018	2.310	0.022
	RatioStaffToStudent	-0.011	0.006	-1.750	0.080
	Intercept	1.177	0.560	2.100	0.035
	F(23,998340.4) = 7.69, p<0.000				
	PercentFreeLunch	-0.029	0.073	-0.390	0.695
	PercentMinority	-0.020	0.108	-0.190	0.850
	PercentFreeLunch X PercentMinority	-0.055	0.172	-0.320	0.751
	PercentOKCollege	-0.041	0.053	-0.770	0.439
Linear (Fixed Effects)	PercentParentTeacherConf	0.011	0.016	0.690	0.488
	AvgSeniorACT	0.008	0.004	2.330	0.021
	RatioStaffToStudent	-0.002	0.001	-1.650	0.100
	Intercept	0.748	0.112	6.700	0.000
	F(23, 436.8) = 7.56, p<0.000				

n=4,361.

Interpreting the significant coefficients for the average senior ACT score from the fixed effects linear model translated to a 2.5% increase in the percent of OK Promise completers for every point increase in the ACT score. Table 4.10 reports the average marginal effects calculated from the fractional probit model. These results suggest that a 1% increase in the average ACT score resulted in a 0.485 increase in the percent of enrolled students that completed OK Promise.

Table 4.10

Average Marginal Effects with Elasticity for Fractional Probit Model- Percentage of OK Promise Enrolled Students that Completed Program

Variable	Dy/Ex	Std. Error
PercentFreeLunch	-0.062	0.121
PercentMinority	-0.037	0.117
PercentFreeLunch X PercentMinority	-0.018	0.109
PercentOKCollege	-0.063	0.075
PercentParentTeacherConf	0.017	0.023
AvgSeniorACT	0.485	0.210
RatioStaffToStudent	-0.092	0.054

Individual year results. Fractional probit models for each individual year were also conducted. The results displayed in Table 4.11 show the regression results for four selected years and the average marginal effects for each variable. Full results for each year are also included in Appendix D. The individual year results show that neither the interaction effects between the percent of minority students nor the percent of students on free/reduced lunch were statistically significant. The percent of parents attending a teacher conference was also not significant for any of the selected years. The Oklahoma college-going rate was statistically significant and positive for 2004 and 2007 but not 2010 nor 2013. The ratio of high school staff to students was statistically significant and negative for 2004 and 2010 but was not significant in 2007 nor 2013. The average ACT score was statistically significant only in 2013.

The average marginal effects from the individual probit models highlight some specific effects on the percent of enrolled students that completed the OK Promise program. A 1% increase in the Oklahoma college-going rate reflected a 0.366 increase in 2004 and a 0.402 increase in 2007. A 1% increase in the ratio of high school staff to students would result in a 0.276 decrease in 2004 and a 0.311 decrease in 2010. A 1% increase in the average senior ACT score in 2013 would translate to a 1.189 increase.

Table 4.11

Fractional Probit Models for Individual Years - Percentage of OK Promise Enrolled Students that Completed Program

Year	Variable	Model Results				Average Marginal Effect	
		Coefficient	Std. Error	T-Score	P-Value	Dy/Ex	Std. Error
	PercentFreeLunch	0.166	0.301	0.550	0.582	0.084	0.153
	PercentMinority	0.320	0.429	0.750	0.456	0.107	0.143
	PercentFreeLunch*PercentMinority	-1.046	0.682	-1.530	0.125	-0.194	0.127
	PercentOKCollege	0.760	0.316	2.410	0.016	0.366	0.152
2004	PercentParentTeacherConf	0.016	0.112	0.140	0.886	0.008	0.055
	AvgSeniorACT	0.008	0.025	0.310	0.757	0.150	0.485
	RatioStaffToStudent	-0.021	0.007	-2.880	0.004	-0.276	0.096
	Intercept	0.337	0.535	0.630	0.529		
	F(7,31053.5) = 5.38,p<0.000						
	PercentFreeLunch	0.255	0.361	0.710	0.480	0.135	0.191
	PercentMinority	0.080	0.405	0.200	0.843	0.029	0.147
	PercentFreeLunch*PercentMinority	-0.976	0.682	-1.430	0.152	-0.204	0.143
	PercentOKCollege	0.818	0.306	2.670	0.008	0.402	0.150
2007	PercentParentTeacherConf	0.001	0.114	0.010	0.995	0.000	0.056
	AvgSeniorACT	0.006	0.023	0.240	0.809	0.111	0.459
	RatioStaffToStudent	-0.015	0.009	-1.680	0.093	-0.211	0.126
	Intercept	0.264	0.510	0.520	0.605		
	F(7,108315.3) = 6.21,p<0.000						
	PercentFreeLunch	-0.469	0.381	-1.230	0.218	-0.262	0.213
	PercentMinority	-0.836	0.489	-1.710	0.087	-0.324	0.189
	PercentFreeLunch*PercentMinority	0.681	0.782	0.870	0.384	0.159	0.183
	PercentOKCollege	0.333	0.299	1.110	0.265	0.157	0.141
2010	PercentParentTeacherConf	-0.093	0.117	-0.800	0.425	-0.046	0.057
	AvgSeniorACT	0.017	0.022	0.780	0.433	0.334	0.426
	RatioStaffToStudent	-0.023	0.010	-2.290	0.022	-0.311	0.136
	Intercept	0.866	0.510	1.700	0.090		
	F(7,206110.4) = 5.99,p<0.000						
	PercentFreeLunch	0.692	0.361	1.920	0.055	0.403	0.210
	PercentMinority	0.580	0.544	1.070	0.286	0.213	0.200
	PercentFreeLunch*PercentMinority	-1.337	0.806	-1.660	0.097	-0.311	0.187
	PercentOKCollege	-0.430	0.317	-1.360	0.175	-0.186	0.137
2013	PercentParentTeacherConf	-0.009	0.104	-0.080	0.933	-0.005	0.055
	AvgSeniorACT	0.060	0.022	2.670	0.008	1.189	0.446
	RatioStaffToStudent	-0.014	0.008	-1.820	0.069	-0.194	0.107
	Intercept	-0.552	0.543	-1.020	0.309		
	F(7,179454.1) = 3.62,p=0.001						

Research Question #3

The final set of analyses examined whether high school contextual factors affected students who completed OK Promise and attended a public research university. As before, three models were evaluated with the imputed data and control variables to account for the panel dataset. Table 4.12 presents the findings with the control variables omitted. The theoretical prediction model can be expressed as follows:

$$OKPResUnivRate = PercentFreeLunch + PercentMinority + PercentFreelunch*PercentMinority +$$

$$PercentOKCollege + PercentParentTeacherConf + RatioStaffToStudent$$

Table 4.12

Fractional Regression Analysis - Percentage of Students that Completed OK Promise & Attended Public Research University

Model	Variables	Coefficient	Std. Error	T-Score	P-Value
	PercentFreeLunch	-0.084	0.231	-0.360	0.716
	PercentMinority	-0.536	0.416	-1.290	0.197
	PercentFreeLunch X PercentMinority	0.346	0.576	0.600	0.549
	PercentOKCollege	-0.231	0.188	-1.230	0.220
Fractional Probit	PercentParentTeacherConf	-0.062	0.059	-1.050	0.294
	AvgSeniorACT	0.078	0.014	5.790	0.000
	RatioStaffToStudent	-0.004	0.005	-0.900	0.371
	Intercept	-3.436	0.401	-8.560	0.000
	$F_{(23, \,2.2e+06)} = 18.77, \, p<0.000$				
	PercentFreeLunch	-0.123	0.416	-0.300	0.767
	PercentMinority	-0.973	0.749	-1.300	0.194
	PercentFreeLunch X PercentMinority	0.589	1.044	0.560	0.573
	PercentOKCollege	-0.384	0.348	-1.100	0.270
Fractional Logit	PercentParentTeacherConf	-0.127	0.105	-1.210	0.226
	AvgSeniorACT	0.147	0.024	6.040	0.000
	RatioStaffToStudent	-0.009	0.009	-0.980	0.326
	Intercept	-6.060	0.711	-8.520	0.000
	$F_{(23, \,2.4e+06)} = 19.04, \, p<0.000$				
	PercentFreeLunch	-0.034	0.051	-0.670	0.505
	PercentMinority	-0.141	0.092	-1.530	0.127
	PercentFreeLunch X PercentMinority	0.109	0.123	0.890	0.376
	PercentOKCollege	-0.039	0.039	-1.010	0.311
Linear (Fixed Effects)	PercentParentTeacherConf	-0.015	0.013	-1.130	0.261
	AvgSeniorACT	0.017	0.003	5.990	0.000
	RatioStaffToStudent	-0.001	0.001	-0.810	0.421
	Intercept	-0.464	0.101	-4.570	0.000
	$F_{(23, \,436.9)} = 19.52, \, p<0.000$				

n=4,318.

Panel results. In this model, the interaction between the percent of students on free or reduced lunch and the percent of minority students was not statistically significant nor were the individual factors. Variables representing the percent of students attending an Oklahoma college, the percent of parents attending a teacher conference, and the ratio of staff to students were also not statistically significant. The high school senior class average ACT score was statically significant

103

at the 0.001 level. The F-test for the fractional probit model was statistically significant (F[23,2.2e+06, 18.77,p<0.000) and both of the other models were as well. R-square values from the individual imputation models ranged from 0.1959 to 0.1979. Pseudo R-square values from the probit and logit models ranged from 0.0457 to 0.0464.

Table 4.13

Average Marginal Effects with Elasticity for Fractional Probit Model- Percentage of Students that Completed OK Promise & Attended Public Research University

Variable	Dy/Ex	Std. Error
PercentFreeLunch	-0.046	0.125
PercentMinority	-0.195	0.151
PercentFreeLunch X PercentMinority	0.075	0.124
PercentOKCollege	-0.110	0.089
PercentParentTeacherConf	-0.031	0.029
AvgSeniorACT	1.547	0.267
RatioStaffToStudent	-0.062	0.069

The linear fixed effects coefficient approximates that a one point increase in the average ACT score resulted in a 1.7% increase in the percentage of OK Promise completers who attended a public research university. The average marginal effects from the probit model reported in Table 4.13 suggest that a 1% increase in the interaction between the percent on free/reduced lunch and the percent minority students translates to a 0.405 change in the percent of OK Promise completers who attended a public research university. A 1% increase in the average ACT score results in a 1.547 percent change if the rate was held constant.

Individual year results. Fractional probit models for individual years resulted in significantly different results than the fixed effect models and are reported in Table 4.14. The interaction between the percent of minority students and the percent of students on free/reduced lunch was statistically significant and positive for 2004, 2010, and 2013 at the 0.05 level. The percent of students attending an Oklahoma college was statistically significant and positive only in 2010. The percent of parents attending a teacher conference was not significant. The ratio of staff to

students was only significant in 2013. The average ACT score was statistically significant and

positive for each of the four selected years.

Table 4.14

Fractional Probit Models for Individual Years - Percentage of Students that Completed OK Promise & Attended Public Research University

Year	Variable	Model Results				Average Marginal Effect	
		Coefficient	Std. Error	T-Score	P-Value	Dy/Ex	Std. Error
	PercentFreeLunch	-1.489	0.332	-4.480	0.000	-0.754	0.168
	PercentMinority	-1.988	0.479	-4.150	0.000	-0.662	0.159
	PercentFreeLunch*PercentMinority	2.941	0.748	3.930	0.000	0.541	0.138
	PercentOKCollege	0.261	0.409	0.640	0.523	0.126	0.197
2004	PercentParentTeacherConf	0.163	0.135	1.210	0.226	0.081	0.067
	AvgSeniorACT	0.104	0.028	3.690	0.000	2.037	0.552
	RatioStaffToStudent	0.001	0.010	0.110	0.916	0.014	0.128
	Intercept	-2.420	0.594	-4.070	0.000		
	F(7,114655.4) = 17.93,p<0.000						
	PercentFreeLunch	-0.907	0.424	-2.140	0.032	-0.476	0.222
	PercentMinority	-1.176	0.563	-2.090	0.037	-0.426	0.204
	PercentFreeLunch*PercentMinority	1.713	0.952	1.800	0.072	0.356	0.198
	PercentOKCollege	0.187	0.379	0.490	0.622	0.092	0.187
2007	PercentParentTeacherConf	0.106	0.130	0.820	0.414	0.052	0.063
	AvgSeniorACT	0.106	0.027	3.860	0.000	2.093	0.542
	RatioStaffToStudent	0.009	0.009	0.950	0.340	0.120	0.125
	Intercept	-2.718	0.581	-4.680	0.000		
	F(7,44298.4) = 9.57,p<0.000						
	PercentFreeLunch	-1.024	0.427	-2.400	0.016	-0.570	0.237
	PercentMinority	-0.549	0.583	-0.940	0.346	-0.213	0.226
	PercentFreeLunch*PercentMinority	1.876	0.943	1.990	0.047	0.440	0.221
	PercentOKCollege	0.830	0.357	2.330	0.020	0.393	0.169
2010	PercentParentTeacherConf	0.080	0.135	0.590	0.554	0.039	0.066
	AvgSeniorACT	0.140	0.029	4.840	0.000	2.760	0.570
	RatioStaffToStudent	-0.002	0.010	-0.220	0.830	-0.028	0.132
	Intercept	-3.933	0.675	-5.830	0.000		
	F(7,63366.8) = 11.53,p<0.000						
	PercentFreeLunch	-1.589	0.419	-3.790	0.000	-0.927	0.245
	PercentMinority	-1.194	0.664	-1.800	0.072	-0.440	0.244
	PercentFreeLunch*PercentMinority	2.453	0.922	2.660	0.008	0.572	0.215
	PercentOKCollege	-0.278	0.397	-0.700	0.483	-0.121	0.172
2013	PercentParentTeacherConf	0.121	0.154	0.790	0.431	0.064	0.082
	AvgSeniorACT	0.082	0.033	2.500	0.013	1.636	0.654
	RatioStaffToStudent	0.029	0.012	2.320	0.020	0.394	0.170
	Intercept	-2.353	0.765	-3.080	0.002		
	F(7,59404.9) = 12.61,p<0.000						

Average marginal effects interpreted as elasticities from the individual year models are

also presented in Table 4.14. A 1% increase in the interaction effect between minority students

and students on free/reduced lunch would result in a 0.541 change in 2004 and a 0.572 change in

2013. A 1% change in the Oklahoma college-going rate would translate to a 0.393 change in

2010. A 1% change in the ratio of staff to students would result in a 0.394 change in 2013. A 1%

change in the average senior ACT score would result in a 2.037 change in 2004 and a 1.636 change in 2013.

Chapter Summary

This chapter presented the findings from the analysis of the sample data for this study. Three research questions were evaluated with each related to a different outcome associated to the OK Promise program. Multiple imputation was utilized to facilitate a balanced dataset for the panel approach over the 10 years examined in the study. Three models were presented for each research question, including the fractional probit model, a fixed effects linear model, and a fractional logit model for comparison purposes. Fractional probit models were also conducted for each individual year as a basis for comparison with the fixed effects results.

The results of the analysis found mixed results between the fixed effects models and the individual year models, suggesting potential issues related to insufficient variance within subjects over time for the fixed effects models. Overall results from the fixed effects models found that each model was statistically significant while the models for the first research question did not yield any significant covariates. The models for the second research question found a positive relationship with the average senior ACT score and OK Promise completion rates. Similarly, the models for the third question also found a positive association between the average senior ACT score and the percent of OK Promise completers who attended a research university.

In contrast to this, the results from the individual year models reached some different results. While the interaction effect was not significant, the percent of students on free/reduced lunch was positively associated with the percent of students that completed OK Promise from each high school for multiple years. The ratio of high school staff to the student body was negatively related to both the percent of students that completed the OK Promise out of the senior class and the percent of students enrolled in OK Promise that completed the program. The Oklahoma college-going rate was positive and significant for multiple years for the first two research questions. The interaction term between the percent on free/reduced lunch and the

percent of minority students was negatively associated with the percent of students enrolled in OK Promise that completed the program while positively associated with the percentage of OK Promise Completers who attended a public research university. The average ACT score of the senior class was also positively related to the percent of students attending a public research university. Individual imputations for the linear models suggested a modest fit for the models. The implications of these results are discussed in the next chapter.

CHAPTER V

FINDINGS, IMPLICATIONS, AND RECOMMENDATIONS

This final chapter of the study provides an overview of the study and discusses

conclusions based on the analysis of the high school effects on participation rates in the OK

Promise program. First, the chapter will review the design of the study including the problem

statement, an overview of the methodology, purpose statement, and research questions. Second,

the chapter will summarize the results from the analysis conducted to address each of the three

research questions. Third, the chapter will discuss the implications of the study for research,

policy, and practice. Fourth, the chapter will identify recommendations for both future research

and practice.

Statement of the Problem

Integrated models of college choice, such as Perna (2006a), suggest that individual

decisions can be influenced by broader contexts such as the student's high school, postsecondary

options, and social, economic, and political forces. Some forms of public policy designed to

affect college choice are financial aid programs that incorporate student merit to determine award

eligibility. Merit aid programs gained popularity due in part to the success of Georgia's HOPE

scholarship and now exist in various forms in 32 states.

Despite the growth of merit aid programs, disparities related to college choice persist for

students from historically disadvantaged groups, such as minority populations and lower

socioeconomic backgrounds (Hurtado, Inkelas, Briggs, & Rhee, 1997; Kimura-Walsh,

Yamamura, Griffin, and Allen, 2008; Lee, Almonte, & Youn, 2012; National Student

Clearinghouse, 2015; O'Connor, Hammack, & Scott, 2010; Perna, 2006b; St. John, Paulson, & Carter, 2005). Other research suggests that merit aid programs largely benefit White, middle-class students (Cornwell & Mustard, 2004; Farrell, 2014; Ness & Tucker, 2008). In Oklahoma, participation in OK Promise, an aid program that utilizes both need and merit requirements, falls well below expected rates based on the state median family income and the program income requirements. A possible explanation for these continued differences in postsecondary access and opportunity is the mediating effect of other contextual factors, such as high schools, on public policy programs. Research on college choice has highlighted the importance of high school factors, including the role of high school counselors (Engberg & Wolniak, 2010; Johnson, 2008; McDonough, 1997; Roderick, Coca, & Nagaoka, 2011).

Statement of Purpose

The purpose of this study was to examine whether contextual factors at the high school level predicted participation rates and postsecondary attendance rates associated with a state financial aid program in the state of Oklahoma. This study evaluated the following research questions:

1. Do contextual factors in Oklahoma public high schools, including school demographic characteristics, the staff to student ratio, the level of parental involvement, the college-going rate, and average ACT scores, affect the percentage of students by high school that participated in Oklahoma's Promise, a state hybrid aid program?

2. Do contextual factors in Oklahoma public high schools, including school demographic characteristics, the staff to student ratio, the level of parental involvement, the college-going rate, and average ACT scores, affect the completion percentage of students by high school enrolled in Oklahoma's Promise?

3. Do contextual factors in Oklahoma public high schools, including school demographic characteristics, the staff to student ratio, the level of parental involvement, the college-going rate, and average ACT scores, affect the percentage of students that completed Oklahoma's Promise and attended a public research university after graduation?

Review of Methodology

Public high schools represented the unit of analysis for this study with the sample composed of Oklahoma schools with data recorded annually between the 2004 to 2013 academic years. Data for the OK Promise program were provided by OSRHE and expressed as percentages associated with each high school. School-level demographic and resource data were used as covariates and were provided by OEQA. Fractional probit, logit, and linear regression models were used with a balanced panel dataset to conduct the analysis. Fractional probit models were also conducted for individual years to compare against the fixed effects results. Missing data were imputed to create a complete dataset and diagnostics were conducted to ensure that outliers and other issues did not affect the outcome of the models.

Summary of Findings

Research Question #1

The first research question examined whether high school factors affected the percentage of students from the senior graduating class that completed the OK Promise program. The findings from this study were statistically significant and the models found a modest fit (when examining the R-square and pseudo R-square values of individual iterations from the imputations). However, none of the covariates for the fixed effects models were statistically significant.

The results from the fractional probit models for individual years found a positive relationship for the percent of students on free/reduced lunch while the interaction effect was not significant. The results suggest that a 1% increase in the percent on free/reduced lunch increased

the proportion of OK students within a schools' senior class that range from 0.287 in 2004 to 0.306 in 2013. The income limits associated with OK Promise and the average income for Oklahoma families closely match each other ($50,000 and $56,000, respectively) so that schools with higher proportions of students on free or reduced lunch should have seen a greater portion of their senior class participate in the program. The findings from this analysis affirm these expectations. A positive relationship suggests that both the state program and individual high schools are encouraging participation in the program and thereby overcoming barriers to access identified by previous research on college access that found decreased participation in the college-going process for both minority group membership and lower socioeconomic status (Hurtado, Inkelas, Briggs, & Rhee, 1997; Lee, Almonte, Youn 2012; Paulson & St. John, 2002).

The ratio of staff (including high school teachers and counselors) to the total number of enrolled students had a negative relationship on OK Promise participation rates. The results mean that a 1% increase in the ratio decreased participation rates ranging from 0.527 in 2004 to 0.294 in 2013. This finding aligns with other research on the role of counselors and teachers on the college choice process. This research suggests schools that have smaller ratios of staff members to students can provide more individual attention to students, particularly with assistance related to planning for college (Bryan, Holcomb-McCoy, Moore-Thomas, & Day-Vines, 2009; NACAC, 2013). Although counselor roles vary considerably with regard to the amount of time they devote toward college preparation for their students (College Board, 2012), the presence and availability of high school staff to assist students on an individual basis can translate into higher participation rates in state programs such as OK Promise.

The percent of students attending an Oklahoma college from previous high school classes was also significant and positive. A 1% increase in the college-going rate increased the participation rate by 0.35 in 2004 and 0.231 in 2010. Previous research on high school efforts related to college choice concludes that schools can facilitate a college-going culture (Engberg &

111

Gilbert, 2014; McKillip, Rawls, & Barry, 2012). None of the other covariates were statistically significant in the individual models.

Research Question #2

The second research question examined whether high school factors influenced the percent of OK Promise enrollees who completed the program. Overall, the models were statistically significant. Goodness-of-fit results were lower in these models than for the first research question, with both smaller R-square and pseudo R-square values for individual imputations. The average senior ACT score demonstrated a positive relationship with the program completion rate, with a 1% increase in the average ACT increasing the percent that completed the program by roughly 0.485. No other covariates were statistically significant.

Individual year results found differing results. The college-going rate was significant and positive for multiple years as was the average senior ACT score, while the ratio of staff to students was significant and negative. A 1% increase in the college-going rate would translate to a 0.366 increase 2004 and a 0.402 increase in 2007 in the percent of students that completed OK Promise. A 1% increase in the average senior ACT score would yield a 1.189 increase in 2013. A 1% increase in the ratio of staff to students would result in a 0.276 decline in 2004 and a 0.311 decline in 2010. No other covariates were significant for the individual year models.

Research Question #3

The final research question explored whether high school effects predicted the percent of students that completed OK Promise and attended a research university. Overall models were statistically significant and goodness-of-fit results from individual imputations suggested a modest fit for the models. The average ACT score demonstrated a positive relationship with the percent of students attending a research university. A 1% increase in the average ACT score would translate into a 1.547 increase in the percent of OK Promise completers attending a public research university. No other covariates were significant for the fixed effect models.

Analysis for the individual years resulted in a significant and positive association with the interaction between the percent of minority students and the percent of students on free/reduced lunch over multiple years. The Oklahoma college-going rate was significant for 2010. The average senior ACT score was also significant and positive for multiple years. The ratio of staff to students was significant and positive in 2013. These findings translate into a 1% increase in the interaction effect ranged from a 0.541 increase in 2004 and a 0.572 increase in 2013. A 1% increase in the Oklahoma college-going rate would yield a 0.393 increase in 2010. A 1% increase in the average senior ACT score ranged from a 2.037 increase in 2004 and a 1.636 increase in 2013.

These findings could demonstrate that schools with higher test scores, as a measure of academic preparation, typically have the resources and underlying demographic characteristics that encourage students to attend a four-year research institution. Additionally, four-year research institutions in the state of Oklahoma have higher admissions criteria for test scores that could contribute to this result. Subsequent studies could explore alternative measures of academic preparation available in the dataset, such as the percent of students that completed a college-ready curriculum.

The proportion of minority and/or students on free or reduced lunch in the individual fractional probit models displayed a positive relationship with the percentage of students attending a public research university. One possible explanation for this result could be that students who chose a research university were a subset of students who completed OK Promise and that by completing the program requirements these students demonstrated a higher level of commitment to attend college and thus possible motivation to consider attending a four-year research institution. However, a potential issue with this research question and its results could be related to selection bias because the students who completed OK Promise already display greater commitment toward fulfilling the academic and non-academic eligibility requirements. Additionally, the percent of OK Promise completers who attended a public research university

represent a fraction of the overall percentage of OK Completers. In 2013, the total number of OK

Promise students attending a public research university represented 28.7% of all students enrolled

in college who completed the program. When examining these trends at an individual high

school level, small school enrollment at the high school could also affect the percentage of

students from that high school who attended a public research university. Possible solutions to

address this issue further are discussed later in the recommendations for future research.

Other Findings

The parental involvement variable was not statistically significant for either the fixed

effect models or the models for individual years. This variable was already available in the

school-level dataset and could represent a poor fit with the construct of parental involvement.

Other measures of parental involvement could provide a better indicator of its actual effect on the

results. Additionally, a selection bias issue could also be occurring due to higher expected levels

of parental involvement required for students to enroll in OK Promise, complete the requirements

during the student's senior year, and attend a specific institution to receive the benefits.

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Implications

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The results of this study provide important implications for scholars, policymakers, and

practitioners on the topics of college choice, public policy, and the relationship between public

high schools and postsecondary access. This section identifies specific implications for theory,

research, and practice that emerged from the findings.

Implications for Theory

This study expanded upon Perna's (2006a) model of college choice that argued that the

individual decisions by prospective students are constrained and influenced by students' families,

high school setting, college setting, and larger social, economic, and political factors.

Specifically, this study sought to determine whether high school factors mediated outcomes

associated with the OK Promise program by testing one component of Perna's model and the

relationship between the high school context and one component of public policy. A number of

studies utilized Perna's model to understand the complexity of the college choice process in a variety of different settings and how the contextual layers affect individual student decisions. However, questions remain about the relationship between these layers and its effect on the college choice process. This study elaborated on a missing part of the conversation on college choice by examining whether the high school contextual layer affected outcomes from the public policy layer in Perna's model. Too often, studies about college choice emphasize choice as an individual construct without fully considering the ramifications of broader factors that set the boundaries that students must navigate. These factors, whether public high schools, postsecondary institutions, or state legislatures, are all active participants in the process with their own resources, missions, and aims. From a theoretical perspective, it remains critical to account for how factors beyond a student's habitus affect their decisions and how the interaction between contexts factor into college choice outcomes. As higher education research continues to explore the various factors that influence college choice, studies that examine college choice from different approaches are necessary to understand the issue.

Implications for Research

  College choice beyond the individual student. This study also sought to address concerns about how the scholarship on college choice frames the issue at the individual level. Researchers such as Rhoades (2014) have criticized current theories of college choice that over-emphasize the role of individual student decision-making in the process when larger factors, such as college costs and efforts by colleges to recruit students, exist at levels beyond the individual student. This study attempted to further this conversation by examining outcomes associated with college choice at the high school level rather than at the individual student level. This approach also expanded on a growing body of research regarding how organizations such as high schools view their role and the effects that constrain or enable their actions. Scholarship on organizational habitus, such as McDonough (1997), suggested that circumstances, whether related to resources or the demographic makeup of the student population and surrounding

communities, affect the worldview and actions of high schools, including individual staff members such as high school counselors, on important areas like college choice.

Higher education scholarship could benefit further from aggregate studies that examine issues such as college choice beyond individual student responses. In states such as Oklahoma, policymakers already measure student outcomes at the elementary and secondary school level with the use of public report cards that aggregate results to compare across schools and districts. Additionally, the state annually reports program outcomes for OK Promise by high school along with identifying and recognizing individual schools with the most number of OK Promise completers by school size. Papke and Wooldridge (2008) suggest that the focus on school-level outcomes has increased due to scrutiny from policymakers and the public regarding student performance in public schools.

The results of this study and future research that examines college choice at contextual layers beyond individual students can help shape and inform policymakers and practitioners about broader trends associated with college choice. Greater attention on the role of stakeholders in the process should yield studies with methodologies that acknowledge greater agency and involvement at both the high school and postsecondary levels. Additionally, this approach can provide opportunities for better comparison across schools to understand similarities and differences in participation rates. Studies that examine aggregate results can also help provide results utilizing existing data to provide a common denominator for policymakers. Although the results of this study cannot be directly applied to individual students and their personal experiences, the methods and results can guide future research to examine college choice beyond the individual level.

The importance of high school resources. The results of this study indicate that the number of available staff, including both high school counselors and high school teachers, can positively impact the percent of students that complete OK Promise out of each graduating class and the percent of those that sign up for the program. These findings echoed other research on

116

the important contribution that high schools, particularly staff such as counselors and teachers, can make on college choice (Bryan, Holcomb-McCoy, Moore-Thomas, & Day-Vines, 2009; NACAC, 2013). Smaller ratios between high school staff and students can provide opportunities for more individual attention both in the classroom and also in other related settings, such as advising and mentoring students on the college-going process. High school counselors can serve a critical role in the process, particularly for students from disadvantaged backgrounds. However, the rise of the testing culture in elementary and secondary education and its impact on the role of high school counselors complicates the issue.

Additionally, this study presented findings that suggest that researchers should continue to examine how school resources can mediate outcomes associated with other financial aid programs. One unique aspect of this dynamic is that the OK Promise program requires a high level of participation from high schools to administer the program, including designating a contact person (whether a teacher or counselor) to coordinate school efforts and meet with students. These responsibilities also include making eligibility determinations during the student's senior year. These expectations differentiate the OK Promise program from other state programs by requiring schools to participate actively in the program. Unlike other states where the role of high school staff is peripheral to state scholarships and financial aid, the design of the OK Promise program creates an opportunity where schools are active participants in the college-choice process early in their students' educational careers.

One finding that could suggest the positive role of high school resources was the association between college-going rates and participation rates. Higher college-going rates could reflect greater emphasis at the school level to encourage participation in higher education and efforts by staff to facilitate an environment conducive to attending college. These results suggest the importance of organizational habitus discussed by scholars such as McDonough (1997) to create and nurture commitment from high school staff to promote a college-going culture that results in greater participation in programs such as OK Promise.

School demographics. Another implication from this study is related to the mixed results regarding school demographics and their effect on participation rates in OK Promise. The lack of significance for the percent of minority students and students on free or reduced lunch on the percent of students that enroll in the OK Promise program was perplexing and raised more questions than it answered. Although care must be taken to ensure that inference is not drawn to suggest that school demographics do not matter when considering initial participation rates in the OK Promise program, the question of how and when these demographic factors play a role remains to be determined. Similarly, the results from the second and third research questions reported that higher percentages of minority and students on free or reduced lunch had a negative relationship on OK Promise completion and a positive relationship on the attendance rates at public research universities.

One possible explanation for these results could be that students and their families self-select out of participating in the program. The hybrid nature of OK Promise includes requirements that students demonstrate financial need and student engagement both in and out of the classroom. Although the early intervention aspect of the program is designed to motivate students to think about college earlier in the process, schools with higher proportions of minority students and/or students from lower socioeconomic backgrounds may struggle to engage their students this early in the process. These schools may not have the resources to encourage students adequately to participate in the OK Promise program or that their students and families are not aware of the program and its benefits. Other requirements such as providing parent tax information to the state could set a high bar for OK Promise participation that might deter students, particularly those from families where going to college is not is not in their worldview. As previously mentioned, Oklahoma's college-going rate ranks 35th among U.S. states, suggesting that many students and their families are neither aware of postsecondary opportunities nor unwilling to capitalize upon these resources. Additionally, the Oklahoma state legislature has tightened program requirements with changes such as the second income check and more

stringent rules while students are in college that could potentially deter students from participating in the program.

Alternatively, the results that demonstrate a positive relationship between the percent of minority students and free/reduced lunch and attending a public research university might reflect a level of engagement not measured by the study results. These schools could engage students earlier in the process so that when their students complete the OK Promise program requirements they are more engaged in the college-choice process that encourages them to consider opportunities at public research universities rather than other postsecondary options. As a result, the possibility of selection bias could exist when considering whether students self-select out or are actively engaged in the process. At a minimum, these results warrant further study on this issue to explore differences in OK Promise participation rates by schools with varying demographic compositions to understand better the dynamics of race and socioeconomic status in the college choice process.

Program eligibility and OK Promise. An important contribution of this study to existing scholarship was examining a state program that has received little individual attention on the issue of college choice. Prior scholarship on OK Promise compared it to other state programs (Domina, 2014; Sjoquist & Winters, 2015) or evaluated it regarding student persistence while in college (Mendoza & Mendez, 2013). A similar program, Indiana's 21st Century Scholars program, has garnered significant scholarly attention (Toutkoushian, Hossler, DesJardins, McCall, & Canche, 2015). This study provided additional context and analysis of a state financial aid program as a part of the literature overshadowed by other prominent programs (such as Georgia's HOPE scholarship or Florida's Bright Futures program) due to their historical role in the merit aid literature, their widespread student participation rates, and engagement with program administrators to access quality data about the programs themselves.

This study also provided an opportunity to examine how the unique nature of the OK Promise program and its requirements affected student participation in the college choice process.

119

Along with Indiana's 21st Century Scholars program, the characteristics of OK Promise that require students to apply to the program while in junior high, coupled with both need and merit-based requirements, set this type of aid program apart from other state programs. Scholars such as Ness (2010) noted the importance of eligibility criteria and the process where legislators and other stakeholders develop and implement them in cases such as the Tennessee HOPE program and the West Virginia PROMISE program. Understanding the policy development of OK Promise could contribute further to a broader dialogue about that process and the effects of program criteria on student participation, particularly for a program that requires student engagement during junior high through college to obtain and receive benefits. Questions remain whether the early intervention component of OK Promise serves as a motivator for students and families to engage in the college-choice process earlier or whether it serves as a weeding tool to limit the state's financial commitment to only students who fulfill the program requirements.

The findings also highlighted another dimension of policy implementation unlike other state merit aid programs. In the case of OK Promise, high school staff are responsible for administering certain parts of the program in conjunction with OSRHE at the state level. This dynamic sets this case apart from other state programs where high schools serve a less active role. This study contributed by examining in part the mediating effect of intermediate actors such as public high schools and their associated characteristics on program outcomes. Future research could examine the program through alternative theoretical approaches, such as principal-agent theory, to understand the dynamics of the relationship between high schools and the state to administer OK Promise. Further exploration and analysis of the dynamics of the OK Promise program, its program requirements, and postsecondary outcomes can contribute to the understanding of the role of state financial aid programs in the college choice process.

Methodological implications. This study drew heavily upon econometric models from Papke and Wooldridge (2008) to address research questions where the unit of analysis represented individual schools and calculated dependent variables as percentages. The use of

non-linear approaches coupled with panel data facilitated the research design to address each research question. This methodology also enabled the study to examine components of college choice beyond individual students while accounting for changes over time. Fractional response variables, whether in the form of percentages or other values, deserve additional attention, particularly as they are measured and evaluated by policymakers and other stakeholders. Improvements in statistical software packages such as Stata can make the use of fractional dependent variables more enticing, but researchers should take care to ensure correct interpretations of any results that utilize these models. For this study, significant results were expressed as percent changes in covariates that translated into direct changes across each of the dependent variables. One potential challenge with the use of these nonlinear models is translating the results into terms that can be easily understood. The use of average marginal effects, expressed using elasticities, in fractional probit models can make interpretation easier when the dependent variable is expressed as a percentage.

Another methodological implication is the use of fixed effects approaches. Cross-sectional analyses are important but can limit the scope of analysis for studies, particularly in a setting where change occurs over time. The use of fixed effects with panel data can help ascertain changes within individual observations without the risk of biased error terms due to omitted variables. However, there are also potential drawbacks with using fixed effect models. The results of this study found mixed results when comparing the results from the fixed effects models and the separate models for the individual years. These findings suggest issues with the coefficients and/or standard errors of the fixed effects model, specifically where there could be insufficient variation within individual observations over time. One possible solution to this would be to examine the same dataset but include fewer panels (years). Other possibilities include using hybrid panel approaches that combine both random effects and fixed effects approaches within the same model (Allison, 2009). Researchers should use caution with fixed effects models where potential issues of insufficient variance over time can confound the results.

Implications for Practice

The results of this study also offered significant practical implications for both policymakers and professionals at the secondary, postsecondary, and policymaking levels. First, the results indicated the importance of high school resources to facilitate participation rates in the OK Promise program. High school staff, including both counselors and teachers, are invested in the success of their students and provide opportunities to pursue higher education. However, efforts to do so are just one role among many that both counselors and teachers must act upon given ever-increasing demands on high school staff. Decreasing the staff to student ratio could provide school staff with additional opportunities for individual engagement with students on topics such as OK Promise participation and college preparation. Resources to hire additional staff devoted to college counseling could encourage more students to participate in programs such as OK Promise, particularly for smaller schools where teachers and other administrators serve the counselor role. Alternatively, reducing counselor workloads related to standardized testing and other administrative responsibilities could also facilitate more interaction and engagement with students in the college choice process. Conversely, revenue shortfalls, such as the one currently experienced in Oklahoma, that result in staff layoffs or shifting responsibilities away from college counseling could negatively impact participation rates in OK Promise.

The results also suggested that resources might not be enough to overcome the demographic characteristics of schools amidst broader contextual factors. Larger social and cultural factors might play a role in OK Promise participation, particularly in a state where the college-going rate lags behind the national average. This is not to say that these barriers cannot be addressed at the high school level. The results of this study suggest that schools can facilitate a college-going culture that translates to higher participation rates in OK Promise. Other attributes such as the academic profile of the school can have a positive effect on participation. This is particularly true for measures such as the ACT which are a part of the college admissions process.

Policymakers and practitioners should also consider the broader dynamics of the college choice process. The models presented in this study only represented a modest fit to explain variation in participation rates across schools. Larger issues not addressed in the study, including the economic conditions in Oklahoma, state support for education, and efforts by individual universities and colleges could also contribute to changes in participation rates in OK Promise. High school factors are one piece of the college choice puzzle. Other factors such as the role of parents and family should also not be discounted despite the inconclusive findings from this study. It is incumbent for stakeholders involved in college choice to consider the broader contextual layers as a part of improving public policy programs such as OK Promise.

Implications for Public Policy

The implications of this study also contribute to the dialogue about the role of the OK Promise program and higher education policy in the state of Oklahoma. The results suggest that factors at the high school level could limit both participation and completion rates in OK Promise. This effect could diminish the state's effort to utilize OK Promise as a policy tool to motivate students to attend college. Improving resources in Oklahoma public high schools (such as reducing staff to student ratios and also facilitating a broader college-going culture) could enhance state goals, such as increasing the number of college graduates.

The study builds upon well-documented outcomes associated with participation in the OK Promise program and its importance to higher education stakeholders. Students who participate and complete the program demonstrate higher academic achievement while in high school and in college. The 2014 OK Promise Annual Report released by OSRHE found that OK Promise students earn a higher GPA than the overall Oklahoma senior class while in high school (3.40 vs. 3.05 in 2013), score slightly higher ACT scores than non-OK Promise students (21.2 vs. 21.0 in 2014), attend college at higher rates than non-OK Promise students (87% vs. 46% in 2014) and remediate at lower rates than non-OK Promise students in Oklahoma colleges (37.2% vs. 38.4% in 2014). While in college, OK Promise students continue to excel with higher first-

year persistence rates in college than non-OK Promise students (81% vs. 71% in 2012), higher 5-year graduation rates than non-OK Promise students (39% vs 30% for the 2009 cohort), and higher 10-year graduation rates than non-OK Promise students (58% vs. 48% for the 2004 cohort). The program also draws widespread support across the state with students from every Oklahoma county completing OK Promise and every public college and university in the state enrolling these students (ORSHE, 2015). In addition to encouraging student behavior, it also rewards students who complete the program with a significant financial award to make a college education more affordable. These outcomes speak for themselves regarding the positive contributions that OK Promise provides to the state of Oklahoma and its students.

In the broader policy context, OK Promise also aligns closely with Oklahoma's participation in Complete College America, a national consortium of states, and its policy goals to increase the number of college graduates across the state. Evidence from this study found that factors at the high school - specifically lower staff to student ratios, increased academic preparation measured by ACT scores, and higher college-going rates - impact participation rates in the program. These effects directly translate into the number of students that complete the program and can utilize OK Promise to succeed in college. Barriers at the high school level that discourage students from participating in OK Promise limit the program's impact on important outcomes such as college completion. If state policymakers are serious about increasing the number of college graduates in the state of Oklahoma, the OK Promise program should be considered a useful policy vehicle toward achieving that goal.

For legislators and other policymakers, this means that program cuts or changes in the eligibility criteria affect the number of participating students from their districts. Limited resources in public schools to promote the program and motivate students to go to college also exacerbate the gap between students eligible to participate and those who actually enroll in OK Promise and complete it. Lawmakers should be concerned about these effects and their impact on the students in their districts who could benefit from the program. Limitations on OK Promise

participation also affect the colleges and universities represented by these same legislators. The

OK Promise program serves as a conduit between high school and higher education and these

effects can impact the number of students enrolled at colleges and universities as well as where

they choose to attend. Increasing resources in public high schools devoted toward promoting a

college-going culture could result in real and lasting impacts for citizens throughout the state to

attend college.

Despite opportunities to increase OK Promise participation, the political climate in

Oklahoma over the past few years focused on reducing costs associated with OK Promise rather

than expanding eligibility requirements and encourage program growth. In 2014, the Oklahoma

governor and state legislature attempted to divert $7.9 million from the OK Promise reserve fund

to shore up a state budget deficit despite a law that kept OK Promise money safe from legislators

using it for other purposes. The state attorney general found this move was illegal and so the

funds remained with OK Promise. More recently, proposed legislation would require OK

Promise students to attend a two-year institution to obtain benefits. Additionally, inaction on

increasing the program income limit of $50,000 decreased the number of students that could

participate due to inflation outpacing this limit. According to OSRHE, the percentage of

Oklahoma families eligible to participate in OK Promise fell from 62% in 2000 to 41% in 2014

(OSRHE, 2015). This inaction led to many middle-class families finding themselves squeezed

out of participating in the program, making college less affordable for students and families that

otherwise could benefit from the program.

The findings also suggest that there are opportunities for better coordination of education

policy at the state level. A holistic approach toward promoting college participation that includes

stakeholders at both the K-12 and higher education levels could assist getting more students to

enroll in the program and to fulfill the program requirements. Specific steps should seek to align

OK Promise participation with other college-going activities, such as AP courses or concurrent

enrollment at local colleges. and should seek to create other incentives to participate in the

program. Efforts at the state level should also emphasize a larger role for colleges and universities in the OK Promise process. Postsecondary institutions reap the benefits of the OK Promise program when students complete the program and attend college. However, the role of colleges and universities is limited to administering the award once the student attends classes. Some institutions exceed this by offering additional scholarship money for OK Promise students or additional services such as financial aid workshops. However, the program demands little effort from individual institutions despite high expectations on students, their families, their schools, and OSRHE to complete the program. Oklahoma colleges and universities should do more to encourage participation in the program by supplementing efforts at the high school level to engage students in the college-going process. Institutions should heed the findings of this study and identify efforts to encourage participation in OK Promise that could translate into additional students attending college after graduation. Strategic efforts such as school visits, financial aid workshops, campus tours, and printed and electronic mail could supplement actions taken at the institutional level and across the state to motivate students and their families to participate. Institutions could also partner with high schools with lower OK Promise participation rates to engage more students in the process.

Limitations

Several limitations emerged while conducting this study. First, the study examined a ten-year period of OK Promise's history from 2004 to 2013. This timeframe was chosen specifically after significant program changes in the early 2000s increased the program income limit in an effort to expand the number of participating students. The design of the study, by using a balanced panel data approach, limited the number of schools included in the study and excluded any schools that opened or closed during the study timeframe. The study did not look at how high school effects changed over time but rather whether these effects influenced associated outcomes with the OK Promise program. Subsequent research that examined different time periods or specific years could expand on the analysis conducted for the study.

126

The results reflect outcomes associated with one hybrid aid program in the state of Oklahoma. Given the diversity of programs that exist across the United States, the findings here can only be generalized to the program itself and not financial aid programs in other states. Specifically, the unique nature of the OK Promise program, the eligibility requirements and significant participation from students, parents, and high school staff from junior high to graduation, presented an opportunity to understand how these dynamics affected college choice outcomes at the high school level. Additional research that examines different states with different program requirements could shed additional light on this topic.

Another limitation was the use of aggregate data at the public high school level. Most studies on college choice examine individual-level data, typically through the use of hierarchical models that consider both individual and aggregate effects. Unlike other research in the literature that used individual student records, this study sought to examine rates across high schools. As the descriptive data analysis demonstrated, Oklahoma high schools vary considerably, particularly with respect to size and the resources available to them. The study also did not include private high schools, which limits generalizing the results to only public high schools.

Another limitation was the use of available data. The study utilized data already collected by the state for both OK Promise participation rates and school-level resource and demographic information. Although many of the factors examined closely mirrored appropriate measures of the respective covariates, limitations with how data were collected and reported by individual school districts affected the results. For example, the level of parental involvement as measured by participation at a parent-teacher conference could represent a weaker construct than other measures. In other instances, steps were taken to address issues with the data such as calculating the counselor ratio to students when the school counselor FTE was zero in almost one-fourth of the cases due in part to small school sizes.

127

<center>**Recommendations**</center>

Recommendations for Future Research

      Several themes emerged during this study through the use of fractional response models to understand whether high school factors predicted student participation rates in OK Promise. However, the conclusions from the study also left many unanswered questions. This section discusses five possible avenues for further research on the topic of OK Promise that emerged over the course of the study.

      School size and enrollment across high schools. One element that was not directly considered in this study was school size. School size was controlled at the unit of analysis and in the ratio of staff to students covariate used for all three research questions. Additionally, the use of a fixed effects approach also controlled for any covariates not included in the models by accounting for variation within schools over time. Despite these steps, it is important to acknowledge differences in school enrollment across Oklahoma schools. High school graduating class sizes from 2 to 1,068 students in the study, with a widely skewed distribution that reflected the rural nature of the state with few high schools with large class sizes.

      The skewed distribution of school size coupled with the findings from this study suggest that school size could affect both the demographic composition of students attending the high school and the resources available at each school. Previous research on class size and college choice noted its effect on the process. Farmer-Hinton and Holland (2008) found significant evidence that smaller schools in the Chicago public school system were able to provide better resources toward college-going activities. They concluded that teachers and counselors could devote more individual attention to students and engage parents in the process.

      School size could be a relevant issue for Oklahoma schools and OK Promise participation. In their annual reports on the program, ORSHE examines differences across students from urban and rural settings in the program, suggesting that there could be differences among students from these backgrounds. Additionally, key differences could relate to staffing

<center>128</center>

and assigned tasks. For example, smaller schools could rely on high school staff that wear multiple hats whereas larger schools can provide specialized staff such as counselors who can focus exclusively on college-going activities. In this study, almost ¼ of the records in the dataset did not have a counselor FTE. The lack of an available counselor meant that teachers or other staff members had to serve as the primary OK Promise contact person. Future research could explore participation rates in OK Promise by examining schools with different enrollment sizes to assess whether high school factors vary across school size. Additional multivariate approaches such as ANOVA for the school participation rates, completion rates, and postsecondary attendance rates by size could provide an additional layer of analysis on the topic.

Changes in OK Promise participation over time. The use of a panel dataset and a fixed effects approach was useful to account for changes in school-level outcomes over time to arrive at overall results for the selected timeframe of the study. However, this study did not address how changes in participation across schools changed over time. Although individual year results were presented in the analysis as a basis for comparison to the fixed effects models, the results were not conducted in a manner to display how changes occurred over time. OK Promise information displayed in Figure 3.2 showed changes in the overall participation rate from 18.9% in 2004 to 27.2% in 2012, while the completion rate slightly increased from 13.3% in 2004 to 17.6% in 2012. Postsecondary attendance in Figure 3.3 showed marginal changes for public research universities from 2004 to 2013 but changes also occurred for other institutional types. Descriptive information in the study sample also showed some change over time. For example, the unweighted mean value of students on free/reduced lunch increased from 51.0% in 2004 to 58.4% while the percent of students attending an Oklahoma college after graduation declined from 47.9% to 43.3% over the same time period. Results for the fractional probit estimates conducted for individual years showed statistically significant effects that varied by year. However, the slight changes over time for the response variables examined in this study proved

potentially troublesome for the fixed effects models due to insufficient variance within schools across years.

Further research could examine changes over time for OK Promise participation in other ways. Additional analysis could examine broader trends over time that affected schools during this time such as the state economy or school funding that could have an impact on the results. Other statistical tools such as time-series models or difference in differences models could explore further issues about changes over time in the OK Promise program. For example, a difference in differences model could be analyzed by obtaining additional school-level data from earlier in the program's history to determine whether the income limit increase that occurred in the early 2000s resulted in significant changes to participation rates in the program after it was implemented. Evaluating changes in program participation over time could yield more robust results about the dynamics of policy change within the OK Promise program over the decades of its existence.

The postsecondary context and OK Promise. This study sought to address one contextual layer of Perna's (2006a) model of college choice about how high school factors affected participation in a public policy program. However, subsequent research could examine the effect of other contextual layers of Perna's model on college choice, including the role of postsecondary institutions. The rise of the enrollment management function within higher education suggests that institutions play an active role to recruit prospective students. Further knowledge about how these efforts affect policy outcomes could shed additional light on programs such as OK Promise. For example, some institutions in Oklahoma, such as both four-year research institutions, offer additional scholarships for students who complete OK Promise and attend. These institutions also target prospective students in the OK Promise program through marketing and events. As mentioned previously and reflected in Figure 3.3, attendance rates for OK Promise students by institution type shifted over the ten-year period of the study.

Subsequent research could apply similar methods at the postsecondary level to determine how institutional characteristics and efforts affect college choice for OK Promise students.

Alternatively, a possible research thread to explore is the use of selection models to account fully for how the college choice process factors into not only participating in OK Promise but also the choice to attend a specific institution. This approach could expand the analysis conducted for the third research question in order to look at trends across institutional types. Further investigation across high schools could test differences in OK Promise participation rates and attendance rates at two-year and four-year institutions to explore potential issues of undermatching, a concept briefly covered in the literature review that suggests that students from disadvantaged backgrounds choose institutions with lower academic profiles than their own.

Developing a better typology of merit aid program. One of the significant issues that emerged during the development of this study and the review of the literature is how scholars defined merit aid programs. There does not appear to be a consensus in the literature on what constitutes a merit aid program. For example, OK Promise was classified as a merit aid program in studies by Sjoquist and Winters (2015) and Domina (2014) while other studies such as Cohen-Vogel, Ingle, Levine, and Spence (2008) and Mendoza and Mendez (2013) consider it a hybrid aid program. Examining individual states with multiple merit-related programs compounds the issue. For example, Domina (2014) utilized Missouri's A+ program as the state merit aid program for his study while Sjoquist and Winters (2015) used Missouri's Bright Flight scholarship, another merit aid program with more stringent merit requirements for their multiple-state study.

This lack of consistency makes interpreting existing research on merit aid programs difficult when comparing across studies and states. Additionally, it can make future research on merit aid programs challenging and potentially affect the outcomes of studies that examine multiple states and/or programs. Given the number of studies that evaluate these programs across states, the development of a comprehensive typology of merit aid programs could assist

131

researchers across multiple dimensions program design and outcomes, including academic criteria, award amounts, funding sources, the scope of participation, and other factors. Studies such as Sjoquist and Winters (2015) classified the programs in their study by different attributes (such as the breadth of program participation) but a more comprehensive approach could provide greater detail across all programs. Typologies such as Perna, Rowan-Kenyon, Bell, Thomas, and Li's (2008) study of state and federal college access programs provide a roadmap to identify common and divergent threads across programs and to also assist with drawing broader conclusions about program effects. The development of a typology of merit aid programs could help better distinguish differences between these programs and other state financial aid programs and could also benefit studies that examine individual programs such as OK Promise by identifying aspects of the program that warrant analysis in greater depth.

Integrating high school-level effects with hierarchical approaches. The use of high school-level effects was intentional on the part of the research design in part due to the research questions asked and the availability of school-level data. Subsequent research on OK Promise could examine both individual-level effects and high-school levels within a hierarchical linear model. This approach is used in several instances in the college choice literature and could enhance the findings of this study by examining college choice at a more comprehensive level. An alternative approach could include a hierarchical model that includes both high school and district-level factors. The State Department of Education in Oklahoma also reports district-level information that might represent better indicators of the resources available to the district and other socioeconomic and demographic characteristics. However, one specific challenge to using district data is that 84% of the 463 public high schools in the state of Oklahoma are represented by one school district that might cause issues with the specifications of any hierarchical models used.

132

Recommendations for Policymakers and Practitioners

The research conducted in this study provides additional opportunities for policymakers and practitioners at all levels that have a stake in OK Promise to consider various courses for future action. This section identifies three key recommendations to improve OK Promise participation rates at Oklahoma public high schools.

Examine eligibility criteria to promote additional opportunities for participation. One of the significant problems associated with OK Promise is the low participation rate of students that initially enroll in the program when examining the state demographic profile. One potential way to address this would be to consider significant changes to the initial eligibility requirements. Possible changes to expand participation in the program include allowing students to sign up for the program during their junior or senior year of high school, allowing high school counselors to enroll students in the program based on other indicators of financial need such as free or reduced lunch status, or increasing the initial income limit for enrolling in the program. For example, the income limit for OK Promise increased to $50,000 in 2002 and the program saw corresponding participation increases as a result of the change. However, that income limit has remained the same for the last 14 years and it is unlikely to change given the economic situation in the state.

Expand resources for high school counselor staff. Given the importance of high school counselors in the college preparation process demonstrated in this study and others, state and local policymakers could collaborate to procure additional resources for career and college planning. This could take several forms including increasing the availability of additional staff at each high school dedicated to college planning or reducing other administrative requirements on high school staff such as test administration. In a state where spending per pupil ranks among the lowest in the country, high school staff are taxed to provide a quality education for Oklahoma students in addition to other demands on their time, not the least of which is involvement in the

OK Promise program. Additional resources could facilitate greater opportunities for students to explore postsecondary options.

Increase expectations for postsecondary involvement in OK Promise. One missing link in the process that warrants further attention from practitioners and policymakers is the role of colleges and universities in the OK Promise process. Involvement by Oklahoma colleges and universities varies considerably by institution. Some institutions offer additional matching scholarships to OK Promise recipients and target OK Promise eligible students for promotional materials, workshops, and other outreach efforts during their senior year. For example, Oklahoma State University offers an additional $1,000 scholarship and hosts various events that OK Promise eligible students are invited to attend. However, given the variety of institutions that OK Promise students attend across the state, better coordination among institutions is necessary to engage students in the process. Additional scholarship money, increased presence at high schools, financial aid workshops, promotional materials, and other targeted efforts by postsecondary institutions in Oklahoma could help both state policymakers and high school staff reduce barriers to postsecondary access and opportunity for these students.

ORSHE already provides a considerable amount of information to high school staff, college staff, and the public about the program through a redesigned website, promotional videos about the benefits of OK Promise, and other targeted recruiting efforts to encourage students to participate. These efforts suggest that the state takes its charge to promote the program seriously. OSRHE could utilize institutional support by helping colleges and universities identify students participating in the program earlier in their high school career to get them in the college recruitment pipeline. Colleges and universities could also partner with OSRHE to offer workshops and other opportunities for direct interaction with students to define student expectations to attend college and complete the OK Promise requirements while in high school.

Concluding Remarks

This study comes at a time when merit aid programs in other states such as Louisiana and Illinois face significant budget cuts due to financial distress at the state level. Programs such as OK Promise in Oklahoma also confront considerable scrutiny by state legislators. During the 2016 legislative session in Oklahoma, several proposed bills are seeking to limit the state's financial responsibilities to the program in an effort to address significant budget shortfalls due to declining state revenue. Some of the proposed changes include limiting students to attend two-year institutions in order to receive OK Promise aid or meet higher academic benchmarks to receive OK Promise benefits at a four-year institution. Although it remains to be seen whether any of these bills will pass, it is important for policymakers and scholars alike to understand how the outcomes of public policy can be influenced at multiple levels. Examining participation rates in the OK Promise program at the state level without accounting for differences across schools or the effects of school demographics and resources presents a narrow view of the complexity of the college choice process. Implementing and supporting programs such as OK Promise occurs at both the state and school level and warrants adequate resources and support at both levels for the continued success of postsecondary opportunity for Oklahoma students through the OK Promise program.

The findings of this study suggest that high school factors can mediate the outcomes of state public policy programs related to higher education access and college choice. The existence of financial aid programs such as OK Promise, while intended to provide students with additional resources to attend college, is not sufficient when considering other contexts that affect student participation in higher education. Constraints on resources and the demographic composition of public high schools can factor into larger trends of student participation in programs such as OK Promise. Additionally, the availability of resources at the high school level to limit the ratio of students to professional staff can have a positive effect on student participation and completion in OK Promise. However, the results from this study also suggest that persisting issues across racial

and socioeconomic dynamics exist that could limit student participation rates at the high school level. Scholars, policymakers, practitioners, and other stakeholders should understand how factors at the high school level affect public policy related to higher education and seek opportunities to address systemic issues that inhibit student participation in the college choice process.

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141

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APPENDICES

APPENDIX A

IRB Determination of Non-Human Subjects

Oklahoma State University Institutional Review Board

Request for Determination of Non-Research or Non-Human Subject

4. **Determination of "Research".**
   One of the following must be "no" to qualify as "non-research":

   A. Will the data/specimen(s) be obtained in a systematic manner?
   ☐ No ☒ Yes

   B. Will the intent of the data/specimen collection be for the purpose of contributing to generalizable knowledge (the results (or conclusions) of the activity are intended to be extended beyond a single individual or an internal program, i.e. widely or universally applicable)?
   ☐ No ☒ Yes

5. **Determination of "Human Subject".**
   A. Does the research involve obtaining information about living individuals?
   ☐ No ☒ Yes
   If no, then research does not involve human subjects, <u>no other information is required</u>.
   If yes, proceed to the following questions.

   All of the following must be "no" to qualify as "non-human subject":

   B. Does the study involve intervention or interaction with a "human subject"?
   ☒ No ☐ Yes

   C. Does the study involve access to identifiable private information?
   ☒ No ☐ Yes

   D. Are data/specimens <u>received</u> by the Investigator with identifiable private information?
   ☒ No ☐ Yes

   E. Are the data/specimen(s) coded such that a link exists that could allow the data/specimen(s) to be re-identified?
   ☒ No ☐ Yes
   If "Yes," is there a written agreement that prohibits the PI and his/her staff access to the link?
   ☐ No ☐ Yes

6. **Signatures**

   Signature of PI _____ Date _12/3/15_

   Signature of Faculty Advisor _Stephen P. Wanger_ Date _12/2/15_
   (If PI is a student)

   ☐ Based on the information provided, the OSU-Stillwater IRB has determined that this project does not qualify as human subject research as defined in 45 CFR 46.102(d) and (f) and is not subject to oversight by the OSU IRB.

   ☐ Based on the information provided, the OSU-Stillwater IRB has determined that this research does qualify as human subject research and submission of an application for review by the IRB is required.

   _____   _12.4.15_
   Dr. Hugh Crethar, IRB Chair   Date

Revision Date: 09/2013   5 of 5

APPENDIX B

Descriptive Statistics by Year

Year	Variable	N	Mean	SD	Min.	Max.
2004	% Students on Free/Reduced Lunch	440	0.51	0.20	0.03	1.00
	% Minority Students	440	0.33	0.19	0.00	1.00
	% HS Seniors Attending Oklahoma College	433	0.48	0.11	0.04	0.79
	% Parents Attending Teacher Conference	407	0.50	0.25	0.01	1.00
	Average ACT of HS Seniors	417	19.70	1.54	13.98	24.74
	Ratio of HS Counselors and Teachers to HS Student Population	440	13.16	4.21	3.53	41.86
	% of OKP Completers of HS Graduating Class	440	0.19	0.12	0.00	0.59
	% of Enrollees that Completed OKP	436	0.72	0.19	0.00	1.00
	% of OKP Completers Attending Research Univ.	430	0.16	0.17	0.00	1.00
	# of Students Enrolled in OKP	440	15.71	14.52	0.00	90.00
	# of Students who Completed OKP	440	11.03	9.81	0.00	54.00
	# of High School Graduates	440	82.46	115.32	5.00	923.00
2005	% Students on Free/Reduced Lunch	440	0.52	0.20	0.02	1.00
	% Minority Students	440	0.34	0.19	0.00	1.00
	% HS Seniors Attending Oklahoma College	433	0.48	0.11	0.09	0.81
	% Parents Attending Teacher Conference	420	0.49	0.24	0.01	1.00
	Average ACT of HS Seniors	421	19.65	1.57	14.70	24.30
	Ratio of HS Counselors and Teachers to HS Student Population	439	14.02	4.86	2.12	43.94
	% of OKP Completers of HS Graduating Class	440	0.21	0.13	0.00	0.83
	% of Enrollees that Completed OKP	437	0.72	0.18	0.00	1.00
	% of OKP Completers Attending Research Univ.	433	0.16	0.18	0.00	1.00
	# of Students Enrolled in OKP	440	16.90	16.14	0.00	94.00
	# of Students who Completed OKP	440	11.73	10.63	0.00	61.00
	# of High School Graduates	440	80.82	111.66	2.00	926.00
2006	% Students on Free/Reduced Lunch	440	0.52	0.19	0.04	1.00
	% Minority Students	440	0.35	0.19	0.00	1.00
	% HS Seniors Attending Oklahoma College	439	0.49	0.11	0.08	0.85
	% Parents Attending Teacher Conference	420	0.48	0.24	0.02	1.00
	Average ACT of HS Seniors	419	19.74	1.63	14.11	23.99
	Ratio of HS Counselors and Teachers to HS Student Population	439	13.79	4.62	2.74	44.99
	% of OKP Completers of HS Graduating Class	440	0.21	0.12	0.00	0.75
	% of Enrollees that Completed OKP	432	0.73	0.18	0.00	1.00
	% of OKP Completers Attending Research Univ.	428	0.16	0.17	0.00	1.00
	# of Students Enrolled in OKP	440	17.72	17.70	0.00	117.00
	# of Students who Completed OKP	440	12.37	11.96	0.00	78.00
	# of High School Graduates	440	81.23	114.10	4.00	909.00
2007	% Students on Free/Reduced Lunch	440	0.53	0.19	0.06	1.00
	% Minority Students	440	0.36	0.19	0.02	1.00
	% HS Seniors Attending Oklahoma College	440	0.49	0.11	0.07	0.92
	% Parents Attending Teacher Conference	417	0.49	0.24	0.00	1.00
	Average ACT of HS Seniors	410	19.73	1.68	14.63	24.38
	Ratio of HS Counselors and Teachers to HS Student Population	439	13.97	4.72	2.80	49.27
	% of OKP Completers of HS Graduating Class	440	0.22	0.12	0.00	0.73
	% of Enrollees that Completed OKP	439	0.70	0.19	0.00	1.00
	% of OKP Completers Attending Research Univ.	433	0.19	0.18	0.00	1.00
	# of Students Enrolled in OKP	440	20.53	20.87	0.00	111.00
	# of Students who Completed OKP	440	13.73	13.56	0.00	82.00
	# of High School Graduates	440	82.49	116.10	2.00	899.00
2008	% Students on Free/Reduced Lunch	440	0.53	0.19	0.06	1.00
	% Minority Students	440	0.37	0.19	0.00	1.00
	% HS Seniors Attending Oklahoma College	438	0.49	0.11	0.06	0.89
	% Parents Attending Teacher Conference	430	0.50	0.25	0.00	1.00
	Average ACT of HS Seniors	410	19.70	1.69	14.50	25.00
	Ratio of HS Counselors and Teachers to HS Student Population	440	13.67	3.67	3.00	34.74
	% of OKP Completers of HS Graduating Class	440	0.23	0.13	0.00	0.78
	% of Enrollees that Completed OKP	437	0.70	0.19	0.00	1.00
	% of OKP Completers Attending Research Univ.	432	0.16	0.16	0.00	1.00
	# of Students Enrolled in OKP	440	21.28	22.19	0.00	125.00
	# of Students who Completed OKP	440	14.24	14.31	0.00	84.00
	# of High School Graduates	440	83.42	117.28	2.00	892.00

Year	Variable	N	Mean	SD	Min.	Max.
	% Students on Free/Reduced Lunch	440	0.54	0.19	0.07	1.00
	% Minority Students	440	0.38	0.19	0.03	1.00
	% HS Seniors Attending Oklahoma College	440	0.49	0.11	0.06	0.89
	% Parents Attending Teacher Conference	429	0.47	0.25	0.00	1.00
	Average ACT of HS Seniors	414	19.77	1.62	14.55	24.60
2009	Ratio of HS Counselors and Teachers to HS Student Population	440	13.69	4.07	3.23	51.47
	% of OKP Completers of HS Graduating Class	440	0.23	0.13	0.00	0.75
	% of Enrollees that Completed OKP	436	0.70	0.18	0.00	1.00
	% of OKP Completers Attending Research Univ.	433	0.14	0.16	0.00	1.00
	# of Students Enrolled in OKP	440	21.16	23.54	0.00	153.00
	# of Students who Completed OKP	440	13.91	14.22	0.00	94.00
	# of High School Graduates	440	81.94	114.82	3.00	921.00
	% Students on Free/Reduced Lunch	440	0.56	0.18	0.07	1.00
	% Minority Students	440	0.38	0.19	0.00	1.00
	% HS Seniors Attending Oklahoma College	440	0.47	0.11	0.03	0.80
	% Parents Attending Teacher Conference	429	0.49	0.25	0.00	1.00
	Average ACT of HS Seniors	417	19.74	1.73	14.30	24.60
2010	Ratio of HS Counselors and Teachers to HS Student Population	440	13.43	4.26	3.50	54.05
	% of OKP Completers of HS Graduating Class	440	0.22	0.11	0.00	0.64
	% of Enrollees that Completed OKP	436	0.71	0.19	0.00	1.00
	% of OKP Completers Attending Research Univ.	430	0.14	0.16	0.00	1.00
	# of Students Enrolled in OKP	440	21.63	25.08	0.00	171.00
	# of Students who Completed OKP	440	14.41	15.26	0.00	122.00
	# of High School Graduates	440	84.13	119.14	2.00	1068.00
	% Students on Free/Reduced Lunch	439	0.58	0.18	0.07	1.00
	% Minority Students	440	0.37	0.19	0.00	1.00
	% HS Seniors Attending Oklahoma College	438	0.45	0.11	0.08	0.83
	% Parents Attending Teacher Conference	427	0.49	0.24	0.00	1.00
	Average ACT of HS Seniors	418	19.69	1.66	14.50	25.45
2011	Ratio of HS Counselors and Teachers to HS Student Population	440	13.68	3.55	2.62	22.80
	% of OKP Completers of HS Graduating Class	440	0.21	0.10	0.00	0.73
	% of Enrollees that Completed OKP	436	0.72	0.18	0.00	1.00
	% of OKP Completers Attending Research Univ.	435	0.15	0.16	0.00	1.00
	# of Students Enrolled in OKP	440	21.44	26.44	0.00	206.00
	# of Students who Completed OKP	440	14.02	15.32	0.00	104.00
	# of High School Graduates	440	82.33	114.57	3.00	992.00
	% Students on Free/Reduced Lunch	439	0.58	0.18	0.07	1.00
	% Minority Students	440	0.37	0.19	0.00	0.98
	% HS Seniors Attending Oklahoma College	438	0.45	0.11	0.08	0.83
	% Parents Attending Teacher Conference	431	0.53	0.25	0.00	1.00
	Average ACT of HS Seniors	414	19.86	1.65	14.37	26.08
2012	Ratio of HS Counselors and Teachers to HS Student Population	440	13.57	3.65	2.13	30.61
	% of OKP Completers of HS Graduating Class	440	0.22	0.11	0.00	1.00
	% of Enrollees that Completed OKP	437	0.73	0.18	0.00	1.00
	% of OKP Completers Attending Research Univ.	433	0.13	0.14	0.00	0.55
	# of Students Enrolled in OKP	440	22.28	28.95	0.00	216.00
	# of Students who Completed OKP	440	14.67	16.61	0.00	128.00
	# of High School Graduates	440	81.74	118.58	3.00	1035.00
	% Students on Free/Reduced Lunch	440	0.58	0.18	0.07	1.00
	% Minority Students	440	0.37	0.19	0.03	0.97
	% HS Seniors Attending Oklahoma College	440	0.43	0.11	0.07	0.73
	% Parents Attending Teacher Conference	433	0.53	0.24	0.00	1.00
	Average ACT of HS Seniors	419	19.88	1.66	14.48	25.20
2013	Ratio of HS Counselors and Teachers to HS Student Population	440	13.69	3.76	2.82	22.73
	% of OKP Completers of HS Graduating Class	440	0.21	0.11	0.00	0.56
	% of Enrollees that Completed OKP	435	0.71	0.18	0.00	1.00
	% of OKP Completers Attending Research Univ.	431	0.13	0.15	0.00	1.00
	# of Students Enrolled in OKP	440	20.82	27.45	0.00	264.00
	# of Students who Completed OKP	440	13.72	16.71	0.00	165.00
	# of High School Graduates	440	79.03	116.62	2.00	1049.00

APPENDIX C

Full Model Results

Research Question 1 – Percentage of High School Graduates that Completed OK Promise, Fractional Probit Panel Model

Variables	Coefficient	Std. Error	T-Score	P-Value
PercentFreeLunch	-0.003	0.173	-0.020	0.984
PercentMinority	-0.306	0.252	-1.210	0.225
PercentFreeLunch X PercentMinority	0.576	0.423	1.360	0.172
PercentOKCollege	0.074	0.110	0.670	0.504
PercentParentTeacherConf	0.030	0.034	0.890	0.375
AvgSeniorACT	0.010	0.007	1.360	0.177
RatioStaffToStudent	-0.005	0.004	-1.220	0.224
dummy05	0.059	0.020	2.900	0.004
dummy06	0.075	0.019	3.990	0.000
dummy07	0.108	0.020	5.480	0.000
dummy08	0.133	0.021	6.240	0.000
dummy09	0.125	0.023	5.510	0.000
dummy10	0.086	0.022	3.910	0.000
dummy11	0.072	0.024	3.060	0.002
dummy12	0.102	0.024	4.310	0.000
dummy13	0.072	0.024	2.990	0.003
aiPercentFreeLunch	0.792	0.237	3.350	0.001
aiPercentMinority	0.355	0.333	1.070	0.287
aiPercentOKCollege	0.980	0.188	5.230	0.000
aiPercentParentTeacherConf	-0.011	0.073	-0.150	0.879
aiAvgSeniorACT	-0.045	0.016	-2.850	0.004
aiRatioStaffToStudent	-0.023	0.006	-3.530	0.000
aiPercentFreeLunch*PercentMinority	-1.018	0.554	-1.840	0.066
Intercept	-0.681	0.281	-2.420	0.015
$F_{(23,541983.7)} = 11.75, p < 0.000$				

n=4,400.

Note: The complete model included dummy variables for each year with 2004 as the base year and control variables for the time-average of each covariate.

Research Question 1 – Percentage of High School Graduates that Completed OK Promise, Fractional Logit Panel Model

Variables	Coefficient	Std. Error	T-Score	P-Value
PercentFreeLunch	-0.010	0.299	-0.030	0.974
PercentMinority	-0.530	0.440	-1.200	0.229
PercentFreeLunch X PercentMinority	1.000	0.733	1.360	0.173
PercentOKCollege	0.125	0.191	0.650	0.513
PercentParentTeacherConf	0.052	0.060	0.860	0.387
AvgSeniorACT	0.017	0.013	1.350	0.178
RatioStaffToStudent	-0.008	0.008	-1.100	0.273
dummy05	0.105	0.036	2.890	0.004
dummy06	0.129	0.033	3.910	0.000
dummy07	0.187	0.035	5.380	0.000
dummy08	0.230	0.037	6.180	0.000
dummy09	0.216	0.040	5.450	0.000
dummy10	0.149	0.039	3.850	0.000
dummy11	0.123	0.042	2.940	0.003
dummy12	0.174	0.041	4.200	0.000
dummy13	0.124	0.043	2.900	0.004
aiPercentFreeLunch	1.328	0.406	3.270	0.001
aiPercentMinority	0.598	0.583	1.030	0.305
aiPercentOKCollege	1.702	0.324	5.260	0.000
aiPercentParentTeacherConf	-0.024	0.128	-0.180	0.854
aiAvgSeniorACT	-0.077	0.027	-2.810	0.005
aiRatioStaffToStudent	-0.040	0.011	-3.560	0.000
aiPercentFreeLunch*PercentMinority	-1.705	0.965	-1.770	0.077
Intercept	-1.087	0.487	-2.230	0.026
$F_{(23, 470417.3)} = 11.45, p < 0.000$				

n=4,400.

Note: The complete model included dummy variables for each year with 2004 as the base year and control variables for the time-average of each covariate.

Research Question 1 – Percentage of High School Graduates that Completed OK Promise, Linear Fixed Effects Model

Variables	Coefficient	Std. Error	T-Score	P-Value
PercentFreeLunch	-0.008	0.052	-0.150	0.880
PercentMinority	-0.098	0.073	-1.340	0.180
PercentFreeLunch X PercentMinority	0.183	0.126	1.450	0.148
PercentOKCollege	0.021	0.033	0.650	0.518
PercentParentTeacherConf	0.009	0.010	0.890	0.374
AvgSeniorACT	0.003	0.002	1.340	0.184
RatioStaffToStudent	-0.001	0.001	-1.220	0.223
dummy05	0.017	0.006	2.890	0.004
dummy06	0.020	0.005	3.880	0.000
dummy07	0.030	0.006	5.360	0.000
dummy08	0.038	0.006	6.110	0.000
dummy09	0.035	0.007	5.360	0.000
dummy10	0.024	0.006	3.770	0.000
dummy11	0.019	0.007	2.850	0.005
dummy12	0.028	0.007	4.090	0.000
dummy13	0.019	0.007	2.790	0.005
aiPercentFreeLunch	0.239	0.070	3.420	0.001
aiPercentMinority	0.111	0.094	1.180	0.240
aiPercentOKCollege	0.296	0.055	5.360	0.000
aiPercentParentTeacherConf	0.001	0.021	0.070	0.943
aiAvgSeniorACT	-0.013	0.004	-2.780	0.006
aiRatioStaffToStudent	-0.007	0.002	-3.560	0.000
aiPercentFreeLunch*PercentMinority	-0.313	0.160	-1.950	0.052
Intercept	0.232	0.082	2.850	0.005
F(23, 436.6) = 11.80,p<0.000				

n=4,400.

Note: The complete model included dummy variables for each year with 2004 as the base year and control variables for the time-average of each covariate.

Research Question 2 – Percentage of OK Promise Enrolled Students that Completed Program, Fractional Probit Panel Model

Variables	Coefficient	Std. Error	T-Score	P-Value
PercentFreeLunch	-0.114	0.223	-0.510	0.610
PercentMinority	-0.102	0.322	-0.320	0.752
PercentFreeLunch X PercentMinority	-0.084	0.505	-0.170	0.867
PercentOKCollege	-0.132	0.159	-0.840	0.403
PercentParentTeacherConf	0.033	0.047	0.720	0.475
AvgSeniorACT	0.025	0.011	2.310	0.022
RatioStaffToStudent	-0.007	0.004	-1.700	0.090
dummy05	0.010	0.033	0.290	0.769
dummy06	0.044	0.031	1.420	0.156
dummy07	-0.041	0.033	-1.250	0.210
dummy08	-0.034	0.036	-0.950	0.344
dummy09	-0.030	0.034	-0.900	0.371
dummy10	0.011	0.036	0.290	0.768
dummy11	0.027	0.036	0.730	0.465
dummy12	0.053	0.037	1.460	0.145
dummy13	-0.013	0.038	-0.340	0.733
aiPercentFreeLunch	0.346	0.288	1.200	0.231
aiPercentMinority	0.492	0.396	1.240	0.214
aiPercentOKCollege	0.966	0.289	3.340	0.001
aiPercentParentTeacherConf	-0.112	0.095	-1.180	0.237
aiAvgSeniorACT	-0.034	0.018	-1.900	0.058
aiRatioStaffToStudent	-0.017	0.006	-2.790	0.005
aiPercentFreeLunch*PercentMinority	-1.118	0.622	-1.800	0.072
Intercept	0.714	0.337	2.120	0.034
$F(23,990778.8) = 7.66$, $p<0.000$				

n=4,361.

Note: The complete model included dummy variables for each year with 2004 as the base year and control variables for the time-average of each covariate.

Research Question 2 – Percentage of OK Promise Enrolled Students that Completed Program, Fractional Logit Panel Model

Variables	Coefficient	Std. Error	T-Score	P-Value
PercentFreeLunch	-0.189	0.373	-0.510	0.612
PercentMinority	-0.175	0.536	-0.330	0.744
PercentFreeLunch X PercentMinority	-0.141	0.836	-0.170	0.866
PercentOKCollege	-0.215	0.264	-0.820	0.414
PercentParentTeacherConf	0.054	0.077	0.700	0.485
AvgSeniorACT	0.041	0.018	2.310	0.022
RatioStaffToStudent	-0.011	0.006	-1.750	0.080
dummy05	0.016	0.055	0.300	0.768
dummy06	0.073	0.052	1.400	0.160
dummy07	-0.069	0.055	-1.260	0.206
dummy08	-0.056	0.060	-0.940	0.349
dummy09	-0.050	0.057	-0.880	0.381
dummy10	0.017	0.060	0.280	0.782
dummy11	0.045	0.061	0.740	0.462
dummy12	0.089	0.061	1.460	0.146
dummy13	-0.019	0.064	-0.300	0.762
aiPercentFreeLunch	0.561	0.480	1.170	0.242
aiPercentMinority	0.807	0.657	1.230	0.220
aiPercentOKCollege	1.598	0.485	3.300	0.001
aiPercentParentTeacherConf	-0.184	0.159	-1.160	0.248
aiAvgSeniorACT	-0.058	0.030	-1.910	0.056
aiRatioStaffToStudent	-0.028	0.010	-2.820	0.005
aiPercentFreeLunch*PercentMinority	-1.821	1.028	-1.770	0.076
Intercept	1.177	0.560	2.100	0.035
F(23,998340.4) = 7.69, p<0.000				

n=4,361.

Note: The complete model included dummy variables for each year with 2004 as the base year and control variables for the time-average of each covariate.

Research Question 2 – Percentage of OK Promise Enrolled Students that Completed Program, Linear Fixed Effects Model

Variables	Coefficient	Std. Error	T-Score	P-Value
PercentFreeLunch	-0.029	0.073	-0.390	0.695
PercentMinority	-0.020	0.108	-0.190	0.850
LunchMinorityInteraction	-0.055	0.172	-0.320	0.751
PercentOKCollege	-0.041	0.053	-0.770	0.439
PercentParentTeacherConf	0.011	0.016	0.690	0.488
AvgSeniorACT	0.008	0.004	2.330	0.021
RatioStaffToStudent	-0.002	0.001	-1.650	0.100
dummy05	0.003	0.011	0.280	0.778
dummy06	0.014	0.010	1.380	0.168
dummy07	-0.015	0.011	-1.300	0.195
dummy08	-0.012	0.012	-0.960	0.340
dummy09	-0.010	0.012	-0.900	0.367
dummy10	0.003	0.012	0.260	0.791
dummy11	0.009	0.012	0.730	0.466
dummy12	0.017	0.012	1.440	0.150
dummy13	-0.004	0.013	-0.320	0.752
aiPercentFreeLunch	0.123	0.094	1.310	0.193
aiPercentMinority	0.191	0.134	1.430	0.154
aiPercentOKCollege	0.316	0.100	3.150	0.002
aiPercentParentTeacherConf	-0.041	0.033	-1.270	0.207
aiAvgSeniorACT	-0.011	0.006	-1.820	0.070
aiRatioStaffToStudent	-0.006	0.002	-2.730	0.007
aiPercentFreeLunch*PercentMinority	-0.414	0.213	-1.940	0.053
Intercept	0.748	0.112	6.700	0.000
F(23, 436.8) = 7.56				

n=4,361.

Note: The complete model included dummy variables for each year with 2004 as the base year and control variables for the time-average of each covariate.

Research Question 3 – Percentage of Students that Completed OK Promise & Attended Public
Research University, Fractional Probit Panel Model

Variables	Coefficient	Std. Error	T-Score	P-Value
PercentFreeLunch	-0.084	0.231	-0.360	0.716
PercentMinority	-0.536	0.416	-1.290	0.197
PercentFreeLunch X PercentMinority	0.346	0.576	0.600	0.549
PercentOKCollege	-0.231	0.188	-1.230	0.220
PercentParentTeacherConf	-0.062	0.059	-1.050	0.294
AvgSeniorACT	0.078	0.014	5.790	0.000
RatioStaffToStudent	-0.004	0.005	-0.900	0.371
dummy05	-0.006	0.045	-0.140	0.888
dummy06	-0.024	0.039	-0.610	0.541
dummy07	0.130	0.043	3.050	0.002
dummy08	0.014	0.042	0.330	0.742
dummy09	-0.079	0.043	-1.850	0.064
dummy10	-0.073	0.046	-1.580	0.113
dummy11	-0.052	0.045	-1.160	0.247
dummy12	-0.138	0.045	-3.040	0.002
dummy13	-0.157	0.047	-3.320	0.001
aiPercentFreeLunch	-1.151	0.295	-3.900	0.000
aiPercentMinority	-0.760	0.467	-1.630	0.104
aiPercentOKCollege	0.703	0.311	2.260	0.024
aiPercentParentTeacherConf	0.265	0.113	2.340	0.019
aiAvgSeniorACT	0.046	0.024	1.950	0.051
aiRatioStaffToStudent	0.023	0.007	3.320	0.001
aiPercentFreeLunch*PercentMinority	2.043	0.683	2.990	0.003
Intercept	-3.436	0.401	-8.560	0.000
F(23, 2.2e+06) = 18.77, p<0.000				

n=4,318.

Note: The complete model included dummy variables for each year with 2004 as the base year
and control variables for the time-average of each covariate.

Research Question 3 – Percentage of Students that Completed OK Promise & Attended Public
Research University, Fractional Logit Panel Model

Variables	Coefficient	Std. Error	T-Score	P-Value
PercentFreeLunch	-0.123	0.416	-0.300	0.767
PercentMinority	-0.973	0.749	-1.300	0.194
PercentFreeLunch X PercentMinority	0.589	1.044	0.560	0.573
PercentOKCollege	-0.384	0.348	-1.100	0.270
PercentParentTeacherConf	-0.127	0.105	-1.210	0.226
AvgSeniorACT	0.147	0.024	6.040	0.000
RatioStaffToStudent	-0.009	0.009	-0.980	0.326
dummy05	-0.017	0.079	-0.210	0.832
dummy06	-0.041	0.070	-0.580	0.562
dummy07	0.227	0.075	3.050	0.002
dummy08	0.026	0.075	0.350	0.728
dummy09	-0.146	0.076	-1.930	0.054
dummy10	-0.134	0.081	-1.650	0.099
dummy11	-0.089	0.081	-1.100	0.271
dummy12	-0.255	0.082	-3.100	0.002
dummy13	-0.289	0.085	-3.400	0.001
aiPercentFreeLunch	-2.026	0.535	-3.790	0.000
aiPercentMinority	-1.268	0.843	-1.500	0.132
aiPercentOKCollege	1.282	0.581	2.210	0.027
aiPercentParentTeacherConf	0.477	0.201	2.370	0.018
aiAvgSeniorACT	0.075	0.042	1.780	0.075
aiRatioStaffToStudent	0.040	0.013	3.170	0.002
aiPercentFreeLunch*PercentMinority	3.556	1.248	2.850	0.004
Intercept	-6.060	0.711	-8.520	0.000
$F_{(23, 2.4e+06)} = 19.04, p<0.000$				

n=4,318.

Note: The complete model included dummy variables for each year with 2004 as the base year
and control variables for the time-average of each covariate.

164

Research Question 3 – Percentage of Students that Completed OK Promise & Attended Public Research University, Linear Fixed Effects Model

Variables	Coefficient	Std. Error	T-Score	P-Value
PercentFreeLunch	-0.034	0.051	-0.670	0.505
PercentMinority	-0.141	0.092	-1.530	0.127
PercentFreeLunch X PercentMinority	0.109	0.123	0.890	0.376
PercentOKCollege	-0.039	0.039	-1.010	0.311
PercentParentTeacherConf	-0.015	0.013	-1.130	0.261
AvgSeniorACT	0.017	0.003	5.990	0.000
RatioStaffToStudent	-0.001	0.001	-0.810	0.421
dummy05	-0.002	0.010	-0.220	0.828
dummy06	-0.005	0.009	-0.570	0.566
dummy07	0.032	0.010	3.120	0.002
dummy08	0.004	0.010	0.400	0.692
dummy09	-0.017	0.009	-1.860	0.063
dummy10	-0.015	0.010	-1.530	0.127
dummy11	-0.010	0.010	-1.010	0.315
dummy12	-0.029	0.010	-3.030	0.003
dummy13	-0.033	0.010	-3.340	0.001
aiPercentFreeLunch	-0.286	0.065	-4.370	0.000
aiPercentMinority	-0.225	0.106	-2.120	0.035
aiPercentOKCollege	0.128	0.064	1.990	0.047
aiPercentParentTeacherConf	0.071	0.028	2.590	0.010
aiAvgSeniorACT	0.017	0.006	2.980	0.003
aiRatioStaffToStudent	0.005	0.002	3.240	0.001
aiPercentFreeLunch*PercentMinority	0.557	0.151	3.680	0.000
Intercept	-0.464	0.101	-4.570	0.000
$F_{(23, 436.9)} = 19.52, p < 0.000$				

n=4,318.

Note: The complete model included dummy variables for each year with 2004 as the base year and control variables for the time-average of each covariate.

Fractional Probit Models by Individual Years

Research Question 1 – Percentage of High School Graduates that Completed OK Promise, 2004-2008

Year	Variable	Model Results				Average Marginal Effect	
		Coefficient	Std. Error	T-Score	P-Value	Dy/Ex	Std. Error
	PercentFreeLunch	0.564	0.174	3.240	0.001	0.287	0.089
	PercentMinority	0.310	0.303	1.020	0.306	0.104	0.101
	PercentFreeLunch*PercentMinority	-0.631	0.452	-1.400	0.162	-0.118	0.084
	PercentOKCollege	0.730	0.182	4.010	0.000	0.350	0.087
2004	PercentParentTeacherConf	0.057	0.079	0.720	0.471	0.028	0.039
	AvgSeniorACT	-0.005	0.015	-0.360	0.717	-0.105	0.288
	RatioStaffToStudent	-0.040	0.006	-7.140	0.000	-0.527	0.074
	Intercept	-0.912	0.319	-2.860	0.004		
		F(7,129011.4) = 22.13,p<0.000					
	PercentFreeLunch	1.012	0.194	5.210	0.000	0.528	0.101
	PercentMinority	-0.045	0.322	-0.140	0.889	-0.015	0.110
	PercentFreeLunch*PercentMinority	-0.739	0.535	-1.380	0.167	-0.144	0.104
	PercentOKCollege	0.539	0.236	2.290	0.022	0.261	0.114
2005	PercentParentTeacherConf	0.236	0.084	2.820	0.005	0.116	0.041
	AvgSeniorACT	-0.023	0.017	-1.410	0.158	-0.460	0.325
	RatioStaffToStudent	-0.017	0.005	-3.410	0.001	-0.241	0.071
	Intercept	-0.876	0.360	-2.430	0.015		
		F(7,96489.7) = 15.57, p<0.000					
	PercentFreeLunch	0.948	0.206	4.600	0.000	0.497	0.108
	PercentMinority	0.076	0.303	0.250	0.802	0.027	0.107
	PercentFreeLunch*PercentMinority	-0.923	0.460	-2.010	0.045	-0.186	0.093
	PercentOKCollege	0.556	0.213	2.610	0.009	0.272	0.104
2006	PercentParentTeacherConf	0.095	0.080	1.180	0.236	0.046	0.039
	AvgSeniorACT	-0.001	0.016	-0.080	0.935	-0.026	0.313
	RatioStaffToStudent	-0.010	0.007	-1.420	0.154	-0.138	0.097
	Intercept	-1.298	0.380	-3.420	0.001		
		F(7,35076.6) = 8.17,p<0.000					
	PercentFreeLunch	0.771	0.239	3.230	0.001	0.407	0.126
	PercentMinority	0.160	0.280	0.570	0.566	0.058	0.101
	PercentFreeLunch*PercentMinority	-0.578	0.474	-1.220	0.222	-0.121	0.099
	PercentOKCollege	0.639	0.216	2.950	0.003	0.314	0.106
2007	PercentParentTeacherConf	0.079	0.087	0.910	0.363	0.039	0.042
	AvgSeniorACT	0.005	0.017	0.290	0.770	0.096	0.327
	RatioStaffToStudent	-0.024	0.006	-3.910	0.000	-0.331	0.085
	Intercept	-1.235	0.367	-3.360	0.001		
		F(7,14058.1) = 6.29,p<0.000					
	PercentFreeLunch	0.749	0.262	2.860	0.004	0.394	0.138
	PercentMinority	-0.265	0.296	-0.890	0.371	-0.098	0.110
	PercentFreeLunch*PercentMinority	-0.109	0.490	-0.220	0.824	-0.023	0.105
	PercentOKCollege	0.749	0.213	3.510	0.000	0.368	0.105
2008	PercentParentTeacherConf	0.029	0.075	0.380	0.702	0.014	0.037
	AvgSeniorACT	-0.015	0.017	-0.860	0.391	-0.287	0.334
	RatioStaffToStudent	-0.026	0.006	-3.940	0.000	-0.350	0.089
	Intercept	-0.767	0.398	-1.930	0.055		
		F(7,25937.2) = 9.76,p<0.000					

Research Question 1 – Percentage of High School Graduates that Completed OK Promise, 2009-2013

Year	Variable	Model Results				Average Marginal Effect	
		Coefficient	Std. Error	T-Score	P-Value	Dy/Ex	Std. Error
2009	PercentFreeLunch	0.307	0.255	1.210	0.228	0.165	0.137
	PercentMinority	-0.486	0.346	-1.400	0.160	-0.184	0.131
	PercentFreeLunch*PercentMinority	0.522	0.556	0.940	0.348	0.115	0.122
	PercentOKCollege	0.697	0.207	3.360	0.001	0.343	0.102
	PercentParentTeacherConf	-0.023	0.079	-0.290	0.775	-0.011	0.037
	AvgSeniorACT	-0.014	0.018	-0.760	0.449	-0.276	0.364
	RatioStaffToStudent	-0.024	0.011	-2.220	0.026	-0.324	0.146
	Intercept	-0.581	0.385	-1.510	0.132		
	F(7,37609.8) = 4.25,p<0.000						
2010	PercentFreeLunch	0.371	0.229	1.620	0.105	0.207	0.128
	PercentMinority	-0.263	0.318	-0.830	0.408	-0.101	0.122
	PercentFreeLunch*PercentMinority	0.265	0.455	0.580	0.560	0.062	0.106
	PercentOKCollege	0.490	0.178	2.760	0.006	0.231	0.084
	PercentParentTeacherConf	0.010	0.075	0.140	0.890	0.005	0.037
	AvgSeniorACT	-0.016	0.017	-0.920	0.356	-0.308	0.334
	RatioStaffToStudent	-0.017	0.008	-2.160	0.030	-0.230	0.106
	Intercept	-0.650	0.380	-1.710	0.088		
	F(7,143536.2) = 6.06,p<0.000						
2011	PercentFreeLunch	0.363	0.257	1.410	0.158	0.212	0.150
	PercentMinority	0.030	0.323	0.090	0.926	0.011	0.121
	PercentFreeLunch*PercentMinority	0.051	0.485	0.110	0.916	0.012	0.114
	PercentOKCollege	0.536	0.211	2.540	0.011	0.240	0.095
	PercentParentTeacherConf	-0.084	0.073	-1.150	0.251	-0.041	0.036
	AvgSeniorACT	-0.020	0.014	-1.380	0.169	-0.385	0.279
	RatioStaffToStudent	-0.027	0.006	-4.350	0.000	-0.363	0.083
	Intercept	-0.487	0.339	-1.430	0.152		
	F(7,57149.6) = 8.54,p<0.000						
2012	PercentFreeLunch	0.175	0.208	0.840	0.399	0.102	0.122
	PercentMinority	-0.022	0.292	-0.080	0.940	-0.008	0.107
	PercentFreeLunch*PercentMinority	0.468	0.426	1.100	0.272	0.109	0.099
	PercentOKCollege	0.364	0.231	1.570	0.116	0.163	0.104
	PercentParentTeacherConf	-0.055	0.072	-0.760	0.446	-0.029	0.038
	AvgSeniorACT	-0.006	0.017	-0.370	0.714	-0.125	0.339
	RatioStaffToStudent	-0.030	0.007	-4.360	0.000	-0.406	0.093
	Intercept	-0.574	0.376	-1.530	0.128		
	F(7,29818.6) = 12.24,p<0.000						
2013	PercentFreeLunch	0.525	0.224	2.340	0.019	0.306	0.131
	PercentMinority	-0.024	0.344	-0.070	0.944	-0.009	0.126
	PercentFreeLunch*PercentMinority	0.140	0.512	0.270	0.784	0.033	0.119
	PercentOKCollege	0.252	0.190	1.330	0.185	0.109	0.082
	PercentParentTeacherConf	-0.002	0.064	-0.030	0.975	-0.001	0.034
	AvgSeniorACT	0.004	0.015	0.270	0.788	0.079	0.293
	RatioStaffToStudent	-0.021	0.006	-3.880	0.000	-0.294	0.076
	Intercept	-1.020	0.318	-3.200	0.001		
	F(7,389325.3) = 11.10,p<0.000						

Research Question 2 – Percentage of OK Promise Enrolled Students that Completed Program, 2004-2008

Year	Variable	Model Results				Average Marginal Effect	
		Coefficient	Std. Error	T-Score	P-Value	Dy/Ex	Std. Error
2004	PercentFreeLunch	0.166	0.301	0.550	0.582	0.084	0.153
	PercentMinority	0.320	0.429	0.750	0.456	0.107	0.143
	PercentFreeLunch*PercentMinority	-1.046	0.682	-1.530	0.125	-0.194	0.127
	PercentOKCollege	0.760	0.316	2.410	0.016	0.366	0.152
	PercentParentTeacherConf	0.016	0.112	0.140	0.886	0.008	0.055
	AvgSeniorACT	0.008	0.025	0.310	0.757	0.150	0.485
	RatioStaffToStudent	-0.021	0.007	-2.880	0.004	-0.276	0.096
	Intercept	0.337	0.535	0.630	0.529		
	F(7,31053.5) = 5.38,p<0.000						
2005	PercentFreeLunch	0.681	0.284	2.400	0.017	0.355	0.148
	PercentMinority	0.457	0.420	1.090	0.277	0.156	0.144
	PercentFreeLunch*PercentMinority	-1.691	0.670	-2.520	0.012	-0.329	0.130
	PercentOKCollege	0.277	0.328	0.840	0.399	0.135	0.159
	PercentParentTeacherConf	-0.028	0.113	-0.250	0.805	-0.014	0.056
	AvgSeniorACT	0.023	0.025	0.920	0.358	0.444	0.481
	RatioStaffToStudent	-0.009	0.006	-1.390	0.166	-0.124	0.089
	Intercept	-0.044	0.548	-0.080	0.935		
	F(7,42081.3) = 5.95,p<0.000						
2006	PercentFreeLunch	0.005	0.294	0.020	0.987	0.002	0.154
	PercentMinority	-0.230	0.437	-0.530	0.598	-0.081	0.153
	PercentFreeLunch*PercentMinority	-0.271	0.716	-0.380	0.704	-0.054	0.143
	PercentOKCollege	0.457	0.325	1.410	0.160	0.224	0.159
	PercentParentTeacherConf	-0.031	0.107	-0.290	0.772	-0.015	0.052
	AvgSeniorACT	0.030	0.023	1.320	0.187	0.593	0.449
	RatioStaffToStudent	-0.009	0.006	-1.430	0.154	-0.122	0.085
	Intercept	0.065	0.520	0.120	0.901		
	F(7,221564.5) = 4.94,p<0.000						
2007	PercentFreeLunch	0.255	0.361	0.710	0.480	0.135	0.191
	PercentMinority	0.080	0.405	0.200	0.843	0.029	0.147
	PercentFreeLunch*PercentMinority	-0.976	0.682	-1.430	0.152	-0.204	0.143
	PercentOKCollege	0.818	0.306	2.670	0.008	0.402	0.150
	PercentParentTeacherConf	0.001	0.114	0.010	0.995	0.000	0.056
	AvgSeniorACT	0.006	0.023	0.240	0.809	0.111	0.459
	RatioStaffToStudent	-0.015	0.009	-1.680	0.093	-0.211	0.126
	Intercept	0.264	0.510	0.520	0.605		
	F(7,108315.3) = 6.21,p<0.000						
2008	PercentFreeLunch	0.095	0.367	0.260	0.795	0.050	0.192
	PercentMinority	-0.086	0.437	-0.200	0.844	-0.032	0.163
	PercentFreeLunch*PercentMinority	-0.478	0.714	-0.670	0.503	-0.102	0.153
	PercentOKCollege	0.760	0.316	2.410	0.016	0.373	0.155
	PercentParentTeacherConf	-0.009	0.099	-0.090	0.925	-0.005	0.049
	AvgSeniorACT	0.001	0.024	0.060	0.954	0.027	0.472
	RatioStaffToStudent	-0.012	0.009	-1.370	0.171	-0.170	0.124
	Intercept	0.390	0.550	0.710	0.478		
	F(7,88292.2) = 4.44,p<0.000						

Research Question 2 – Percentage of OK Promise Enrolled Students that Completed Program, 2009-2013

Year	Variable	Model Results				Average Marginal Effect	
		Coefficient	Std. Error	T-Score	P-Value	Dy/Ex	Std. Error
2009	PercentFreeLunch	-0.173	0.327	-0.530	0.597	-0.092	0.175
	PercentMinority	-0.194	0.495	-0.390	0.696	-0.073	0.187
	PercentFreeLunch*PercentMinority	-0.118	0.741	-0.160	0.874	-0.026	0.163
	PercentOKCollege	0.164	0.287	0.570	0.569	0.081	0.141
	PercentParentTeacherConf	-0.164	0.110	-1.490	0.136	-0.077	0.052
	AvgSeniorACT	0.030	0.023	1.280	0.200	0.590	0.460
	RatioStaffToStudent	-0.015	0.008	-1.850	0.065	-0.209	0.113
	Intercept	0.340	0.513	0.660	0.508		
	F(7,66300.9) = 4.68,p<0.000						
2010	PercentFreeLunch	-0.469	0.381	-1.230	0.218	-0.262	0.213
	PercentMinority	-0.836	0.489	-1.710	0.087	-0.324	0.189
	PercentFreeLunch*PercentMinority	0.681	0.782	0.870	0.384	0.159	0.183
	PercentOKCollege	0.333	0.299	1.110	0.265	0.157	0.141
	PercentParentTeacherConf	-0.093	0.117	-0.800	0.425	-0.046	0.057
	AvgSeniorACT	0.017	0.022	0.780	0.433	0.334	0.426
	RatioStaffToStudent	-0.023	0.010	-2.290	0.022	-0.311	0.136
	Intercept	0.866	0.510	1.700	0.090		
	F(7,206110.4) = 5.99,p<0.000						
2011	PercentFreeLunch	0.033	0.397	0.080	0.934	0.019	0.231
	PercentMinority	0.940	0.464	2.030	0.043	0.351	0.173
	PercentFreeLunch*PercentMinority	-1.432	0.707	-2.030	0.043	-0.338	0.167
	PercentOKCollege	0.304	0.302	1.010	0.314	0.136	0.135
	PercentParentTeacherConf	-0.003	0.102	-0.030	0.977	-0.001	0.051
	AvgSeniorACT	-0.006	0.024	-0.260	0.791	-0.123	0.465
	RatioStaffToStudent	-0.041	0.009	-4.680	0.000	-0.562	0.120
	Intercept	1.107	0.559	1.980	0.048		
	F(7,767377.0) = 6.10,p<0.000						
2012	PercentFreeLunch	-0.114	0.335	-0.340	0.734	-0.066	0.195
	PercentMinority	0.861	0.510	1.690	0.091	0.317	0.188
	PercentFreeLunch*PercentMinority	-1.256	0.705	-1.780	0.075	-0.293	0.164
	PercentOKCollege	0.424	0.358	1.180	0.236	0.190	0.161
	PercentParentTeacherConf	0.146	0.114	1.280	0.200	0.076	0.060
	AvgSeniorACT	-0.003	0.026	-0.120	0.901	-0.065	0.519
	RatioStaffToStudent	-0.038	0.010	-3.650	0.000	-0.511	0.140
	Intercept	0.975	0.587	1.660	0.098		
	F(7,19551.4) = 5.30,p<0.000						
2013	PercentFreeLunch	0.692	0.361	1.920	0.055	0.403	0.210
	PercentMinority	0.580	0.544	1.070	0.286	0.213	0.200
	PercentFreeLunch*PercentMinority	-1.337	0.806	-1.660	0.097	-0.311	0.187
	PercentOKCollege	-0.430	0.317	-1.360	0.175	-0.186	0.137
	PercentParentTeacherConf	-0.009	0.104	-0.080	0.933	-0.005	0.055
	AvgSeniorACT	0.060	0.022	2.670	0.008	1.189	0.446
	RatioStaffToStudent	-0.014	0.008	-1.820	0.069	-0.194	0.107
	Intercept	-0.552	0.543	-1.020	0.309		
	F(7,179454.1) = 3.62,p=0.001						

Research Question 3 - Percentage of Students that Completed OK Promise & Attended Public
Research University, 2004-2008

Year	Variable	Model Results				Average Marginal Effect	
		Coefficient	Std. Error	T-Score	P-Value	Dy/Ex	Std. Error
2004	PercentFreeLunch	-1.489	0.332	-4.480	0.000	-0.754	0.168
	PercentMinority	-1.988	0.479	-4.150	0.000	-0.662	0.159
	PercentFreeLunch*PercentMinority	2.941	0.748	3.930	0.000	0.541	0.138
	PercentOKCollege	0.261	0.409	0.640	0.523	0.126	0.197
	PercentParentTeacherConf	0.163	0.135	1.210	0.226	0.081	0.067
	AvgSeniorACT	0.104	0.028	3.690	0.000	2.037	0.552
	RatioStaffToStudent	0.001	0.010	0.110	0.916	0.014	0.128
	Intercept	-2.420	0.594	-4.070	0.000		
	F(7,114655.4) = 17.93,p<0.000						
2005	PercentFreeLunch	-0.577	0.402	-1.440	0.151	-0.301	0.209
	PercentMinority	-0.536	0.583	-0.920	0.358	-0.183	0.199
	PercentFreeLunch*PercentMinority	0.241	1.001	0.240	0.810	0.047	0.195
	PercentOKCollege	0.315	0.547	0.580	0.565	0.153	0.266
	PercentParentTeacherConf	0.322	0.148	2.180	0.030	0.158	0.073
	AvgSeniorACT	0.074	0.039	1.930	0.055	1.459	0.757
	RatioStaffToStudent	0.007	0.011	0.580	0.560	0.093	0.160
	Intercept	-2.475	0.820	-3.020	0.003		
	F(7,51814.9) = 10.78,p<0.000						
2006	PercentFreeLunch	-1.435	0.370	-3.880	0.000	-0.748	0.193
	PercentMinority	-1.919	0.489	-3.930	0.000	-0.674	0.172
	PercentFreeLunch*PercentMinority	2.949	0.862	3.420	0.001	0.589	0.172
	PercentOKCollege	-0.241	0.426	-0.570	0.572	-0.118	0.210
	PercentParentTeacherConf	0.191	0.147	1.300	0.195	0.093	0.071
	AvgSeniorACT	0.140	0.026	5.350	0.000	2.766	0.517
	RatioStaffToStudent	0.007	0.010	0.680	0.499	0.091	0.134
	Intercept	-3.064	0.585	-5.230	0.000		
	F(7,154006.5) = 16.44,p<0.000						
2007	PercentFreeLunch	-0.907	0.424	-2.140	0.032	-0.476	0.222
	PercentMinority	-1.176	0.563	-2.090	0.037	-0.426	0.204
	PercentFreeLunch*PercentMinority	1.713	0.952	1.800	0.072	0.356	0.198
	PercentOKCollege	0.187	0.379	0.490	0.622	0.092	0.187
	PercentParentTeacherConf	0.106	0.130	0.820	0.414	0.052	0.063
	AvgSeniorACT	0.106	0.027	3.860	0.000	2.093	0.542
	RatioStaffToStudent	0.009	0.009	0.950	0.340	0.120	0.125
	Intercept	-2.718	0.581	-4.680	0.000		
	F(7,44298.4) = 9.57,p<0.000						
2008	PercentFreeLunch	-1.456	0.404	-3.610	0.000	-0.761	0.211
	PercentMinority	-1.013	0.544	-1.860	0.063	-0.377	0.203
	PercentFreeLunch*PercentMinority	1.937	0.956	2.030	0.043	0.414	0.204
	PercentOKCollege	0.060	0.407	0.150	0.884	0.029	0.200
	PercentParentTeacherConf	0.040	0.128	0.310	0.754	0.020	0.063
	AvgSeniorACT	0.116	0.031	3.820	0.000	2.292	0.601
	RatioStaffToStudent	0.013	0.010	1.240	0.215	0.175	0.141
	Intercept	-2.826	0.684	-4.130	0.000		
	F(7,67437.8) = 15.35,p<0.000						

Research Question 3 - Percentage of Students that Completed OK Promise & Attended Public Research University, 2009-2013

Year	Variable	Model Results				Average Marginal Effect	
		Coefficient	Std. Error	T-Score	P-Value	Dy/Ex	Std. Error
2009	PercentFreeLunch	-0.807	0.397	-2.040	0.042	-0.430	0.212
	PercentMinority	0.107	0.761	0.140	0.888	0.041	0.289
	PercentFreeLunch*PercentMinority	0.596	1.113	0.540	0.592	0.132	0.246
	PercentOKCollege	0.825	0.365	2.260	0.024	0.407	0.180
	PercentParentTeacherConf	0.022	0.140	0.160	0.874	0.010	0.066
	AvgSeniorACT	0.112	0.029	3.890	0.000	2.213	0.569
	RatioStaffToStudent	0.004	0.010	0.410	0.679	0.059	0.142
	Intercept	-3.550	0.645	-5.510	0.000		
	F(7,320788.0) = 9.64,p<0.000						
2010	PercentFreeLunch	-1.024	0.427	-2.400	0.016	-0.570	0.237
	PercentMinority	-0.549	0.583	-0.940	0.346	-0.213	0.226
	PercentFreeLunch*PercentMinority	1.876	0.943	1.990	0.047	0.440	0.221
	PercentOKCollege	0.830	0.357	2.330	0.020	0.393	0.169
	PercentParentTeacherConf	0.080	0.135	0.590	0.554	0.039	0.066
	AvgSeniorACT	0.140	0.029	4.840	0.000	2.760	0.570
	RatioStaffToStudent	-0.002	0.010	-0.220	0.830	-0.028	0.132
	Intercept	-3.933	0.675	-5.830	0.000		
	F(7,63366.8) = 11.53,p<0.000						
2011	PercentFreeLunch	-1.446	0.456	-3.170	0.002	-0.842	0.266
	PercentMinority	-1.699	0.552	-3.080	0.002	-0.636	0.207
	PercentFreeLunch*PercentMinority	2.965	0.864	3.430	0.001	0.701	0.204
	PercentOKCollege	0.427	0.403	1.060	0.289	0.191	0.180
	PercentParentTeacherConf	-0.084	0.107	-0.780	0.435	-0.041	0.053
	AvgSeniorACT	0.136	0.031	4.450	0.000	2.680	0.602
	RatioStaffToStudent	0.021	0.012	1.820	0.069	0.289	0.159
	Intercept	-3.437	0.668	-5.140	0.000		
	F(7,27819.8) = 12.70,p<0.000						
2012	PercentFreeLunch	-0.183	0.411	-0.440	0.657	-0.106	0.240
	PercentMinority	-0.017	0.593	-0.030	0.977	-0.006	0.219
	PercentFreeLunch*PercentMinority	0.253	0.909	0.280	0.781	0.059	0.212
	PercentOKCollege	0.602	0.335	1.800	0.073	0.271	0.151
	PercentParentTeacherConf	-0.024	0.126	-0.190	0.849	-0.013	0.066
	AvgSeniorACT	0.098	0.027	3.600	0.000	1.937	0.538
	RatioStaffToStudent	0.051	0.010	5.180	0.000	0.694	0.134
	Intercept	-4.002	0.609	-6.570	0.000		
	F(7,370756.2) = 14.98,p<0.000						
2013	PercentFreeLunch	-1.589	0.419	-3.790	0.000	-0.927	0.245
	PercentMinority	-1.194	0.664	-1.800	0.072	-0.440	0.244
	PercentFreeLunch*PercentMinority	2.453	0.922	2.660	0.008	0.572	0.215
	PercentOKCollege	-0.278	0.397	-0.700	0.483	-0.121	0.172
	PercentParentTeacherConf	0.121	0.154	0.790	0.431	0.064	0.082
	AvgSeniorACT	0.082	0.033	2.500	0.013	1.636	0.654
	RatioStaffToStudent	0.029	0.012	2.320	0.020	0.394	0.170
	Intercept	-2.353	0.765	-3.080	0.002		
	F(7,59404.9) = 12.61,p<0.000						

VITA

David Wayne Mariott

Candidate for the Degree of

Doctor of Philosophy

Thesis: STATE FINANCIAL AID POLICY AND COLLEGE CHOICE: THE EFFECTS OF PUBLIC HIGH SCHOOL CHARACTERISTICS ON PARTICIPATION RATES IN OKLAHOMA'S PROMISE

Major Field: Educational Leadership and Policy Studies/Higher Education

Biographical:

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Completed the requirements for the Doctor of Philosophy in Educational Leadership and Policy Studies at Oklahoma State University, Stillwater, Oklahoma in May, 2016.

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Experience:
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Professional Memberships:
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