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AUTONOMY AND HIGHER EDUCATION: INSIGHT INTO THE AUTONOMY SYSTEM IN THE COMMONWEALTH OF VIRGINIA

A Dissertation
Presented in partial fulfillment requirements
For the degree of PH.D. of Education in the Department of Higher Education
The University of Mississippi

by

George Lamar Rutherford, II

December 2021

University of Mississippi

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Abstract

Institutions of Higher Education (IHEs) have wrangled with state governmental agencies for decades about the role the government should assume in overseeing campus operations. IHEs continue to argue that government intrusion impedes efficient IHE operation. Government agencies counter that IHEs are provided tax dollars to complete the job of educating the states' citizens and that IHEs must abide by the rules and regulations set by the state. However, over the last two decades, state funding for IHEs is at an all-time low; yet governments still dictate how IHEs operate. With decreased state funding, IHEs sought to replace those funds by focusing on external funding sources such as tuitions. These issues strain the relationship between IHEs and state governments resulting in IHEs calling for more autonomy in campus operations.

In 2005, the Commonwealth of Virginia passed the Restructured Higher Education Financial and Administrative Operations Act, known as the Restructuring Act. This legislation created a unique autonomy system in Virginia that provided IHEs an opportunity to obtain substantial autonomy over their affairs. This dissertation reports results of research seeking to better understand the autonomy system in Virginia. This study examined pre-autonomy Virginia Commonwealth University (VCU) (2006-2008) and post-Autonomy III VCU (2009-2015). Post-Autonomy III VCU has complete autonomy over its finances and operations and are not under the authority of the Commonwealth of Virginia. This study sought to determine if post-Autonomy III VCU had higher minority enrollment percentages, smaller administrative and

management staff percentages, and higher axillary revenue percentages. Also, this research reviewed minority enrollment percentages, administrative and management staffing percentages, and auxiliary revenue percentages to determine if autonomy status influenced Virginia Commonwealth University's minority enrollment percentages, administrative and staffing percentages, and auxiliary revenue percentages compared to non-autonomous comparative IHEs in Virginia.

The Delta Cost Project Database (DCPD) was created in 2007 to make the Integrated Postsecondary Education Data System (IPEDS) more usable for longitudinal research (American Institutes of Research, 2017). In 2012, the American Institutes for Research (AIR) assumed responsibility for the database while the National Center for Educational Statistics (NCES) maintained the database. The data stored in the DCPD spans from 1987-2015 (AIR, 2017). The DCPD provides data on 184 public IHEs in the United States (AIR, 2017). The DCPD database also includes data related to enrollment and administrative expenditures, as well as auxiliary expenditures.

The research conducted within this dissertation yielded promising results. Post-Autonomy III VCU possessed a more diverse enrollment and employed less administrative and management staff. Further, VCU created a higher percentage of revenue for auxiliary enterprises and possessed a higher percentage of minority enrollment than non-autonomous IHEs in Virginia.

This research was designed to gain a better understanding of the autonomy system in Virginia. The results indicate that a relationship exists between autonomy and how IHEs operate. Further research on autonomy in higher education is needed to determine how autonomy impacts efficiency. However, to date, little research exists related to this topic in the United States. This study contributes to our understanding of and raises future research question about the relationship between institutional autonomy and multiple institutional outcome

DEDICATION

This dissertation is dedicated to my family and all of those who love the field of higher education.

List of Abbreviations & Symbols

AC	Academic Capitalism
AIR	American Institutes for Research
B	Beta Value
BOV	Board of Visitors
CAFR	Comprehensive Annual Financial Report
DCPD	Delta Cost Project Database
DiD	Difference-in-Difference
EVA	Electronic Procurement System
F	F-Value
HE	Higher Education
IHE	Institutions of Higher Education
IPEDS	Integrated Postsecondary Education Data System
IEES	Institutional Equity Effectiveness and Success
IT	Information Technology
M	Mean
MOOCS	Massive Online Open Courses
NCES	National Center for Educational Statistics
NIH	National Institutes of Health
N	Number of Data Points
NSF	National Science Foundation
P	P-Value

PAT	Principal-Agent Theory
R^2	Variance
RA	Restructured Higher Education Financial and Administrative Operations Act
RI	Carnegie Classification for High Research Activity
SCHEV	State Council of Higher Education for Virginia
SD	Standard Deviation
SE	Standard Error
SHEEO	State Higher Education Executive Officers Association
SWAM	Small, Women-Owned and Minority-Owned Businesses
UK	United Kingdom
USA	United States of America
VCU	Virginia Commonwealth University

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First and foremost I thank God for without HIS steadfast love this dissertation would not be possible. Without a doubt, HE was my rock throughout this process.

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To my family, Angela and Sara, I owe every success in my life to the two of you. You inspire me and motivate me to want to be successful. You pick me up when I am down and make me laugh when I want to cry. Without the two of you, I am not here today. I love you both more than I can express with words, and I hope my actions reflect my feelings. I never want to do life without the two of you. Trey, you are such a blessing to our family, and I'm thankful for you being in our lives. You are an answered prayer and such a wonderful son-in-law. I love you.

To all of my family and friends who prayed for me and served as my cheerleaders, I am forever grateful. Thank you all so very much.

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Chapter 1 - Introduction

Over the past twenty years, higher education experienced a shift in financial operations. Prior to this time, public institutions of higher education (IHEs) received a large portion of their total budget from state and federal governmental sources. Scott and Hart (1991) wrote about this shift in higher education finances in the 1990s. These researchers noticed that IHEs started to shift their focus from the traditional liberal arts model to a more research-based model in order to compensate for reduced governmental funding at that time. This research-based model with a focus on external funding helped IHEs offset diminished public funding in an effort to continue pursuing their missions (Scott & Hart, 1991). With these operational changes and shifts, IHEs sought alternate, external funding sources for continued operations to provide postsecondary opportunities to students and to conduct research that contributed to society.

Researchers noted that during times of economic hardship, higher education is often one of the first areas that public officials look to for funding cuts; thus, during the national recession that began in 2008, IHEs experienced a definite reduction of state funding (Delaney, 2014; Delaney & Doyle, 2011). In 1995, the State Higher Education Executive Officers Association (SHEEO) reported that 12.9% of state budgets were used to fund higher education. This same report showed that, only 9.6% of state budgets were allocated to fund higher education in 2019. With this trend, IHEs sought external funding and had to increase reliance on student tuition dollars to fund operations. State appropriations for higher education have increased between

2008 and 2019; unfortunately, those increases are still 8.7% below the pre-recession levels in 2008.

To further exacerbate these funding issues, student enrollment has declined for the past eight years (2011-2019) across the USA (SHEEO, 2019). This enrollment decline took place at a time when IHEs received the majority of their operating revenue from student tuition. Thus, a perfect storm occurred with historic declines in state funding and the decline in student enrollment where IHEs could not supplement the loss of public funding with student tuition dollars (SHEEO, 2019). Due to the downward trend in enrollment and governmental funding, IHEs privatized higher education or developed a business-like model for funding and operation (Fryar, 2012; Liefner, 2003; Morphew & Eckel, 2009; Touthoushian, 2009; Liefner, 2003).

With public funding decreasing, some IHEs have sought reduced government oversight. Prominent scholars researching IHE organizational structures have noted the strained relationship between IHEs and governmental entities because even as government funding decreased, IHE oversight by states has not decrease (Leslie & Berdahl, 2008; McLendon, 2003; Reed et al., 2002). This tension between IHEs and governmental agencies significantly increased due to the Great Recession of 2008 (Aliyeva, 2016).

While IHEs have always desired less oversight and more autonomy, the Great Recession of 2008 provided the opportunity for IHEs to push harder for more autonomy. Schultz (2016) noted that IHEs have petitioned for autonomy since the 1980s. As a result, states have created various methods or policies to placate IHEs' call for less oversight. Some states have created governing boards (Bastedo, 2005). Some states have moved from governing boards to coordinating boards to allow IHEs in those states more flexibility in decision-making (Marcus, 1997; McLendon, 2003). And some states created structures tying funding to outcomes deemed

appropriate by the states (Alexander, 2000; Dougherty & Natow, 2015; Huisman & Currie, 2004; McLendon et al., 2006; Stensaker & Harvey, 2011; Zumeta, 1998). Other states use oversight to push a higher education agenda focused on increasing human capital and producing skilled individuals in the most efficient manner (Winston, 1999). As a result, IHEs have sought a balance and tried "to make adjustments to meet these political and social demands" required by states (Aliyeva, 2016, p.5). Leslie et al. (2012) stated, "higher education institutions face a challenge to provide their instruction, research, and services in an accessible, affordable, and efficient way to satisfy the needs of their multiple stakeholders, who are increasingly concerned about how funds are expended" (p. 615). Aliyeva (2016) observed that state governments often pressure IHEs to be cost-effective in all areas of operations. Knott and Payne (2004) noted that states want low tuition and high-quality education. In essence, IHEs have lobbied for autonomy for decades while state governments regularly have ratcheted up oversight measures, even while reducing state appropriations for higher education. During this time and particularly after the Great Recession of 2008, IHEs pushed harder for more autonomy.

Statement of the Problem

Because state government funding of IHEs has dwindled since the 1990s, IHEs were required to seek alternative funding sources (Liefner, 2003; SHEEO, 2019; Slaughter & Rhoades, 2004; Zusman, 2005; Zumeta et al., 2012, Zusman, 2005). As this occurred, researchers dubbed this different model of IHE funding as managerialism or academic capitalism (AC) where IHEs focused on external funding sources and treated operational mechanisms similarly to how corporations operate (Scott & Hart, 1991; Slaughter & Leslie, 2001). Even while state funding declined or remained stagnant, state governments wanted to maintain high levels of oversight and exert control over IHE operations (Alexander,

2000). Historically, as far back as 1959 and when state funding was at higher levels, researchers noted that IHEs were wary of governmental oversight (Glenny & Dalglish, 1973; Moos & Rourke, 1959). These scholars stated that the only way for IHEs to achieve their missions was through autonomy (Berdahl, 1971; Moos & Rourke, 1959). States have reacted in various ways to IHEs demands for less oversight and more autonomy. Autonomy and oversight have been topics of discussion in higher education circles for decades, and these will likely continue to be discussed as scholars continue to research and write about autonomy in higher education. (McLendon, 2003; Hutchens, 2007; Schultz, 2016; and Aliyeva, 2016). One state, the Commonwealth of Virginia, provides an optimal location for studying the balance between governmental oversight and IHE autonomy due to the IHE autonomy legislation enacted in the Commonwealth. This study contributes to our understanding of whether IHEs with greater levels of autonomy in the Commonwealth of Virginia function at more efficient levels by measuring minority enrollment, administrative spending, and auxiliary revenues.

Purpose of the Study

By researching the IHE autonomy system in the Commonwealth of Virginia, this study will contribute to established knowledge by providing a better understanding of the relationship between autonomy and spending patterns, as well as enrollment standards for IHEs in the commonwealth. This research will provide IHE administrators, faculty, and staff, as well as governmental agencies in the USA, more information about how autonomy might impact IHE spending, as well as enrollment standards. Williamson's (1985) Principal-Agent Theory (PAT) provides the conceptual framework for this study. PAT provides the model to help explain the relationship between state government as the

principal and IHEs as the agents. Specifically, the study will explore the principal's (Commonwealth of Virginia) grant of additional autonomy to select agents (IHEs in the Commonwealth of Virginia that qualify for additional autonomy) to determine the relationship between IHE autonomy and its impact on spending patterns and enrollment patterns at different IHEs in the Commonwealth.

Significance of Study

This study seeks to fill a void in a research area within higher education with implications for better understanding how autonomy levels are related to multiple IHE outcomes. As noted by SHEEO (2019), at 9.6%, IHEs are still well below the 12.9% budget allocation from state governments in 1995. This decrease in funding from state governments has helped create new pressures for IHEs to adopt practices associated with managerialism or academic capitalism (AC) (Liefner, 2003; Rabvosky, 2012; Saunders, 2007; Slaughter & Leslie, 1997; Touthoushian, 2009). Prior research documents the positive and negative impacts that have developed from AC. Positively, scientific discovery has increased, and new technologies are developed more rapidly (Mendoza, 2012). Human capital at IHEs has also improved along with IHEs increased prestige (Mendoza, 2012). Negatively, IHEs have become production-oriented in terms of grant funding and publication productivity, directly affecting women faculty and the liberal arts (Johnson & Taylor, 2019; Williams, 2019; Aleman, 2014; Bensimon, 1995).

Researchers (Glenny, 1959; Berdhal, 1971 and 1990; Chambers, 1970; Nyborg, 2003; Hutchens, 2007) have previously studied autonomy at IHEs, but much of prior research focused on defining attributes of autonomy and what led to IHEs demands for more autonomy (Berdhal, 1971 and 1990; Chambers, 1970; Glenny, 1959; Hutchens, 2007;

Nyborg, 2003). Other scholars have attempted to determine how to measure autonomy at IHEs. Fisher (1988) noted that autonomy could be measured by the number of legislative acts, and Aliyeva (2016) concluded that autonomy could be measured by the amount of control an IHE has over its mission. Other scholars contended that autonomy should be measured by financial flexibility and the amount of governmental intrusion into academics and research (Aliyeva, 2016; Anderson and Johnson, 1998; Voogt and Volkwein, 1997)

Aliyeva (2016) focuses on the competing visions or priorities of IHEs compared to state governments. State governments tend to focus on enrollment standards, graduation rates, diverse student populations, as well as developing a skilled workforce (Alexander, 2000; Ewell, Jones, & Kelly, 2003; Knott & Payne, 2004; Payne & Roberts, 2002; Zumeta et al., 2012). In terms of vision, IHEs focus on prestige and research production, which can result in tension with state governmental goals for higher education (Brewer et al., 2004; Leveille, 2005; Mohrman et al., 2008). Further, IHEs place their priority on prestige and research due to the lack of state government funding (Slaughter & Rhoades, 2004; Zumeta et al., 2012; Zusman, 2005). Aliyeva (2016) noted that even as IHEs primarily fund their way, state governments still want to decide how IHEs operate.

While not an overlooked research area, the literature on IHE autonomy is limited in several areas. There are only a handful of studies that consider what autonomy looks like in operation. Aliyeva (2016) looked at several IHEs with financial autonomy and found that financially autonomous universities spend more funding on research. In contrast, IHEs that depend on more on state government funds tend to spend more on instruction. In 2005, the Commonwealth of Virginia passed the Restructured Higher Education Financial and Administrative Operations Act, known as the Restructuring Act. The Restructuring Act created

three levels of autonomy for IHEs, with what is known as Autonomy III being complete autonomy. Leslie and Berdahl (2008) completed a three-year case study examining the three institutions in Virginia that received Autonomy III classification in 2006, the first year of eligibility. They found that three years into the Restructuring Act, Autonomy III positively impacted capital projects and human resource management. Furthermore, their paper contended that the ability to have management flexibility, save on construction, hold and manage funds, and operate human resources with fewer constraints held promise for future IHEs seeking autonomy (Leslie and Berdahl, 2008). More recent research conducted by Schultz (2016) determined that Autonomy III IHEs in the Commonwealth enjoyed greater organizational flexibility, greater efficiencies, better campus culture, and a better student experience. They also had the ability to create their own vision, promote innovation, and rewards for performance. Schultz's study, published five years ago, provided a view of autonomy in action at Autonomy III IHEs through the lens of administrators and policymakers (Schultz, 2016).

The autonomy legislation in Virginia provides a context to better understand the effects of autonomy in institutional outcomes and how IHEs in the Commonwealth operate when granted increased autonomy. Lines of inquiry include the impact of autonomy on efficiency improvement, financial improvement, and creating a more diverse student enrollment. The Restructuring Act for IHEs with Autonomy III could provide positive impacts, but due to the lack of research in this area, these impacts remain unknown. The legislation in Virginia presents the opportunity to determine how one institution, VCU, has responded to a grant of increased autonomy.

Local Context

This study will focus on autonomy in higher education. The Commonwealth of Virginia statutorily created an IHE autonomy system, but there is little data to determine the effectiveness of this autonomy system. This study will research spending and revenue as well as enrollment patterns at Virginia Commonwealth University (VCU). In 2008, VCU received the highest level of autonomy within the system, Autonomy III. VCU was chosen by the researcher because data can be accessed for VCU three years before receiving autonomy and eight years after receiving autonomy.

Conceptual Framework

Principal-Agent Theory (PAT) is based on the delegation of tasks between two entities' resources (Braun & Guston, 2003). One entity, the principal, possesses a resource but does not possess the ability to complete a task. For example, one might have plenty of money but not the skill to build a house. Therefore, the principal needs an agent, a person or entity that completes the task. For example, the agent would be the contractor hired to build the house. The agent agrees to conduct the principal's business at an agreed-upon fee, whether monetary or otherwise. Further, a relationship/contract develops between the principal and the agent who then become actors in this process (Braun & Guston, 2003). Williamson (1985) noted that this relationship is sometimes unstable as actors typically maintain self-interest to maximize their welfare. Further, Williamson (1985) noted that the principal cannot be sure that the agent will perform at the agreed-upon level, which can result in sub-par performance from the principal's perspective.

Aliyeva (2016) used PAT to research the relationship between IHEs and state governments. The paper noted Aliyeva (2016) found that IHEs with some form of financial

autonomy used more funds for research and innovation. Additionally, the author noted that IHEs relying more heavily on state government funding used a high percentage of that funding for instruction. They also argued that the PAT is appropriate because a contractual relationship exists between the state government (principal) and the IHEs (agent) in the state (Aliyeva, 2016). PAT provides a useful theory to help guide this study because IHEs and state governments traditionally have a relationship that operates under PAT. The state holds the funding or resources as the principal actor, and the IHE as the agent knows how to carry out the task of providing postsecondary education in the state.

This study will be conducted using a panel data analysis and a fixed-effects model. Aliyeva (2016) conducted a panel data analysis using a fixed-effects model to determine whether IHEs with financial autonomy spend their funds differently than IHEs that do not possess financial autonomy. This study will also use panel data sources to determine how one IHE possessing Autonomy III in the Commonwealth of Virginia, VCU, spends funds compared to IHEs in the Commonwealth without lower levels of autonomy. This study will use the Delta Cost Project Data (DCPD) panel data to determine how Autonomy III impacts auxiliary revenue, administrative and management staffing, and student minority enrollment.

Research Questions

With the Restructuring Act, the Commonwealth of Virginia statutorily created an autonomy system for IHEs that frees institutions with the highest statutory autonomy from substantial types of state regulation. As a result, IHEs with such autonomy are largely responsible for their own oversight. IHEs in the Commonwealth with Level III Autonomy do not have to bid out construction projects. These institutions can also streamline their institutional management, as well as create their own enrollment policies. For this study, I hypothesize that

one institution, Virginia Commonwealth University (VCU), which received Autonomy III status in 2008, will possess a more diverse enrollment, have fewer administrative managers and staff, and create more revenue through auxiliary enterprises when compared to the university prior to gaining Autonomy III status. Further, VCU will possess a more diverse enrollment, have fewer administrative managers and staff, and create more revenue within auxiliary enterprises than comparative Virginia public IHEs. To research my hypothesis, I will use DCPD data to conduct a longitudinal (2005-2015) study of VCU and comparative Virginia institutions and will address the following research questions:

- How do minority enrollment percentages, administrative staffing percentages, and auxiliary revenue percentages at Virginia Commonwealth University differ before receiving (2005-2008) and after receiving Autonomy III status (2008-2015)?
- How do minority enrollment percentages, administrative staffing percentages, and auxiliary revenue percentages differ between post Autonomy III status Virginia Commonwealth University and comparative public IHEs in Virginia?

Limitations

This study will use panel data for data collection allowing for quantitative methods to be conducted which creates several limitations. First, the data will consist only of quantitative panel data, so there are no qualitative methods in the study. In essence, by not having qualitative data, this study does not allow a deeper substantive and contextual examination of IHE autonomy in Virginia that could come with qualitative data, such as that provided through interviews. Further, the study uses quantitative data; therefore, research questions are limited to data that has been previously collected. Additionally, the data will also not be randomized. Comparison IHEs were chosen based on their non-autonomy

status. Those institutions could have factors that contribute to outcome variables regardless of their autonomy status. The study is also limited to one state. Currently, there are five IHEs in Virginia with Autonomy III classification. Of the Autonomy III IHEs, VCU is the only IHE in the Commonwealth of Virginia that provides an adequate amount of data before and after receiving Autonomy III status. VCU received Autonomy III in 2008 and went into effect in 2009. That provides three years of pre-autonomy data and six years of post-Autonomy III data. This study will only focus on one Autonomy III IHE rather than all five of the Autonomy III IHEs in Virginia. Finally, this study will only use comparisons of IHEs in Virginia, which limits generalizability.

Organization of the Study

This chapter provides a background on the changing landscape of higher education. Further, this chapter provides an overview that explains the potential contributions of research on autonomy at IHEs in the United States. Chapter 2 explores relevant literature on the historical changes in higher education, entrepreneurialism or academic capitalism, autonomy and the measurement of autonomy. It will also explore the mismatch of ideas between IHEs and state governments, state funding mechanisms, and finally, a review of Virginia Commonwealth University and the Commonwealth of Virginia's autonomy system. Chapter 3 details the theory and methodology of the study. Chapter 4 discusses the results of the study, and Chapter 5 provide a thorough discussion of the results and the implications for future research.

Chapter 2 - Literature Review

This literature review seeks to examine connections and potential connections between IHE autonomy and enrollment patterns, as well as university expenditures. The literature review will explore multiple areas. First, I will provide a brief history of higher education and its transition from a liberal arts focus to an entrepreneurial focus. Secondly, this chapter explores is provided. Second, entrepreneurialism/academic capitalism (AC) and Autonomy will be discussed. Third, institutional autonomy and its different forms. The next section discusses the entrepreneurial university's ideas, followed by fourth area covered will be a review of different measurement models used to measure autonomy. The mismatch between IHEs and state governments will be reviewed. State funding and decision-making will be explored. Finally, I will provide an in-depth review of Virginia Commonwealth University and the autonomy system in Virginia is provided.

The Transition from the Liberal Arts IHE to the Entrepreneurial IHE

American higher education began to emerge during the colonial period in American history. Since the founding of Harvard College in 1636, American higher education has constantly evolved. Thelin (2019) refers to the early start of higher education in America as the Colonial Period. The English settlers in America brought the university idea with them. The focus of the university during the Colonial Period was to educate clergymen and train them for the ministry. As a result, higher education during the Colonial Period was reserved for white,

Christian males. During the early 1800s to 1860s, the number of colleges and universities increased substantially. With this new era, educational opportunities arose within medicine, engineering, and law. Also, teaching opportunities arose within colleges and universities, and women began attending college during this period to become teachers.

During the mid-nineteenth century, the first federal higher education law, the Morrill Act of 1862, was passed. This legislation marked the first time that the federal government became directly involved with higher education. The Morrill Act of 1862 created Land Grant Institutions focusing on agriculture, mechanical and military sciences, and liberal arts education. The Second Morrill Act of 1890 provided federal funds to finance African American higher education and created historically black colleges and universities.

As described by Goldin and Katz (1999), the Formative Years ranged from roughly 1890 to 1940 marked key formative years in the development of the 1940s.contemporary university. Goldin and Katz (1999) describe how during this period that colleges and universities started to focus on chemistry, physics, and the manufacturing process involved in producing steel, rubber, and other goods. In other words, higher education began specializing to train college attendees for particular purposes. IHE enrollment also increased during this period from previous eras. As enrollment increased and faculty became more specialized, research institutions emerged as the predominant force in higher education. This trend continued through World War II when U.S. higher education then entered what has been termed a golden age (Thelin 2004, 2011, 2019).

After World War II, American veterans needed assistance transitioning back into society and the workforce. The federal government worked to aid veterans transitioning back into the United States and eventually passed one of the most prominent higher education laws in history with the Servicemen's Readjustment Act, famously known as the G.I. Bill. The influx of

students entering college, researchers dubbed this period as helped spur the Golden Age of higher education, which spanned from 1945 to 1970 (Thelin 2019). Further, the federal government became more involved in higher education in addition to measures like the G.I. Bill that boosted enrollment. During the Cold War era, the United States counted on IHEs to conduct research to ensure the country stayed ahead of the Soviet Union. To achieve this lofty goal, the United States created grant awarding agencies such as the National Institutes of Health and the National Science Foundation. During this golden age, IHEs experienced an enormous surge in enrollment and an increased focus on research, which was aided substantially by an influx of federal dollars. As a result, the government incorporated oversight and accountability for the increased federal funding of IHEs.

Over the past 50 years, higher education continued to experience change and periodic disruptions. With the passage of the Basic Educational Opportunity Grant Program in 1972, higher education became more accessible. Baum et al. (2013) noted that college has emerged as the next step in life for high school graduates, and access for women and minorities has increased during the last fifty years. The paper also noted the increased enrollment of non-traditional students and the addition of for-profit institutions. IHEs are now large, bureaucratic operations that differ in important respects from IHEs during the golden age. The age that higher education exists in today has been named by higher education historians as the Age of Managerialism (Scott and Hart, 1991), or Academic Capitalism (AC) as characterized by (Slaughter and Leslie, 2001) as one of increasing AC. Aleman (2014) defines managerialism or AC as the period where quantifiable production metrics govern universities. As IHEs have transitioned from the golden age to the Age of Managerialism, there has come to exist more focus on production in a context of reduced state assistance.

The Entrepreneurial University

Over the last few decades, higher education has been in a constant state of change. Students can consume education in multiple forms, such as for-profit online degree programs and massive online open courses (MOOCS) for individuals not seeking a degree without attending a single on-campus course. To respond to such changes, IHEs have employed multiple methods to allow the university to continue to be compelling to the customer, but IHEs still face difficult challenges. Even as state funding for higher education has continued to decline (SHEEO, 2019), state governments still seek to exert substantial control over IHEs. Toutkoushian (2009) notes that the decrease in state funding has left IHEs scrambling to shift their policy to combat the lack of appropriations. The decreased funding within higher education has caused IHEs to think differently about their funding (Liefner, 2003; Sigahi & Saltorato, 2020). Rabovsky (2012) insisted that if universities must fund their operations, they should control those funds. Aliyeva (2016) contended that institutions with less dependency on the government should possess flexibility with funds as they see fit. Fowles (2014) concurred that universities should allocate funds in alignment with their institutional mission and goals and not those of the government.

Reduced levels of state funding have helped push institutions to adopt practices associate with academic capitalism (AC) or entrepreneurialism. Saunders (2007) defined AC as the "involvement of colleges and faculty in market-like behaviors" (p.2). Sigahi and Saltorato (2020) described AC as "Administrative Academic Capitalism" (p. 105) because the focus on the new entrepreneurial university is centered mechanisms of bureaucracy and administration. Research in this area has concluded that IHEs have become entrepreneurial, profit-based, and prestige-driven (Slaughter and Leslie, 1997; Taylor and Cantwell, 2018). The authors declared that this is a direct result of a lack of state funding. This change in focus to entrepreneurism and

academic capitalism can have both positive and negative effects on how universities operate and higher education outcomes. One positive, as identified by Mendoza (2012), is industry-related collaborations. Mendoza (2012) noted that scientific discovery has never been better in higher education, stating, "Industry-academia collaborations are not new. Academic scientists have played a major role in developing new technologies for the government and the public throughout the twentieth and twenty-first centuries" (p. 28). The researcher also recognized benefits for human capital with the AC model and that AC has created prestige among certain universities where grant writing staff and researchers have a better standard of living. In addition to the positive aspects of the AC model, negative aspects also exist.

Several researchers have written extensively on the adverse effects that AC has had on women in higher education (Johnson & Taylor, 2019; Aleman, 2014; and Bensimon, 1995). Aleman (2014) stated, "The corporate university is governed through quantifiable metrics of production. In this scheme, faculty publication is objectively measured in quantity, and not quality, of publication" (p. 110). Bensimon (1995) warned that the "managerial institution would create an institutional climate that affects women adversely" (p. 109). Johnson and Taylor (2019) contended that "there is a continued underrepresentation of female faculty members at public institutions with the highest level of research" (p. 29). Williams (2019) argued that AC has harmed women's studies programs due to a focus on prestige and research. Other researchers such as Clark (1998) have eloquently noted that if universities diversity funding models and obtain greater financial sufficiency, this can create a state of affairs that has been referred to as active autonomy.

As universities change and become more entrepreneurial, governmental oversight should arguably also adjust. Governments can either allow universities to be completely autonomous,

partially autonomous, or continue to govern as usual. Government control of IHEs, according to Mills (2007), was at its apex after World War II. The oversight trend continued through the 1970s. McLendon and Ness (2003) noted that well over 100 measures to modify higher education governance were passed or considered and voted on by state governments from 1985 to 2002. According to Schultz (2016), IHEs began petitioning state governments for autonomy in the late 1980s and early 1990s. As a result of these petitions, states began creating activist governing boards (Bastedo, 2005). Bastedo (2005) defined activists governing boards as boards with "aggressive and independent use of the policy-making process which resulted in board organization which was appreciably different from that of a traditional board" (p. 552). These activist governing boards led to the development of institutional entrepreneurship at IHEs (Bastedo, 2005)

As a result of AC, IHE culture has changed. Schultz (2016), citing Tierney (1989), declared, "The culture of an organization constitutes human existence to such an extent that predication and the ability to reduce organizational meaning to predetermined meaning are impossible" (p. 28). Tierney (1989) stated that it is crucial to understand the complexity of campus and policy changes and how these changes impact the culture of IHEs. Tierny (2006) has argued that only the organization that can adapt, evolve, and redefine itself can effectively meet its mission and institutional goals.

Defining Autonomy

The idea of autonomy within public IHEs is not a new concept. Glenny (1959), writing more than six decades ago, discussed the invention of state governing boards and how their overreach could interfere with a university's efficiency and autonomy. Berdahl (1971) and Neave and Van Vught (1994) discussed the idea of an autonomous university. university's idea.

IHEs have struggled consistently been at odd with state government over autonomy-related matters.

In terms of its importance to higher education, Glenny and Dalglish (1973) asserted that institutional autonomy, along with academic freedom and tenure, formed the bedrock of American higher education. Chambers (1970) argued that undue interference by state governing boards destroyed the autonomy of the university and amounted to "absentee-landlordism." Glenny and Dalglish (1973) also warned about outside influences attempting to dictate IHEs' internal affairs and believed IHEs should be concerned about outside and political influences. Moos and Rourke (1959) concluded that autonomy was of the utmost importance if IHEs were to achieve their missions of collecting, disseminating, and advancing knowledge.

Overall autonomy (substantive, procedural, and academic) is defined by Aliyeva (2016) as "the degree to which public higher-education institutions can govern themselves to meet their goals and missions without state government control" (p. 11). Aliyeva (2016) argued that any IHE under the control of a board that governs its actions cannot be autonomous. Further, the meaning of autonomy for IHEs has evolved based on the unique context of the state political and economic environment and/or country where an institution exists (Neave, 1988; Tapper & Salter, 1995; Hutchens, 2007; Yokoyama, 2009). Autonomy, at its core, is based on an entity's right to self-govern itself without excessive or harmful influence from outside entities (Aliveva, 2016).

Fisher (1988) defined autonomy as "the institution's power to conduct its affairs and to use its resources as it determines, without interference or regulation by outside bodies" (p. 138). Hutchens (2007) used the definition created by Berdahl, Altbach, and Gumport (1999) that autonomy is the ability to govern without external interference. Voogt and Volkwein (1997) defined autonomy as "the degree to which public higher education can govern itself in financial,

personnel, and academic matters without control by federal, state, and/or external control" (p. 1). Nyborg (2003) stated that autonomy is "the overall ability of an institution to act by its own choices in the pursuit of its mission" (p.2). In essence, autonomy deals with the extent to which an entity is free to control its fate by making its own, largely in relation to control over hiring and financial decisions on whom to hire or how to spend its finances. Altbach, Berdahl, and Gumport (1999; 2005) classify autonomy in higher education along three domains: substantive, procedural, and academic. An institution's overall autonomy can be viewed as a combination of its substantive, procedural, and academic elements.

Berdahl (1990) indicated that substantive autonomy is an institution's ability to establish its own goals, and Voogt and Volkwein (1997) defined substantive autonomy as an institution's ability to protect its academic core from outside interference. McLendon (2003) noted that substantive autonomy allows universities to make core academic decisions and the freedom to choose how to evaluate student learning. Substantive autonomy allows for the freedom to choose staff and students, as well as to set standards for continued employment and enrollment, freedom over curriculum, and the freedom to control the internal budget of a campus (Asby,1966; Hutchens, 2007) According to Berdahl (1971), substantive autonomy encompasses the power of the university in its corporate form to determine its own goals and programs. Schulz (2016) compiled literature that breaks substantive autonomy into two distinct pieces: the university's overall operation and the daily management of university affairs. Berdahl (1971) and Goodchild et al. (1997) noted that substantive autonomy is an act of a university governing itself with little to no outside influence, too much oversight can harm the procedural autonomy (Berdahl, 1971; Goodchild et al.,1997). Further, Goodchild et al. (1997) concluded that substantive autonomy is the act of protecting the academic core of the university with full

authority over the admissions process, degree curriculum, and graduation requirements. Schulz (2016) stated, "These types of autonomies are common within IHEs (in Virginia) and exists with varying degrees within Level III Virginia institutions" (p. 17).

Mclendon (2003) described “procedural autonomy as pertaining to how institutions go about achieving the institutions’ substantive goals, including allocation and accounting of funds and decisions related to personnel hiring” (p. 68). Voot and Volkwein (1997) viewed procedural autonomy as “the authority to establish administrative, budgetary, and operational policies and procedure” (p. 2) or). Or, as Berdahl (1990) put it, autonomy represents the ability of an institution to establish the means and methods by which the goals of an institution will be achieved. Berdahl et al., Altbach, and Gumport (1999) depicted procedural autonomy as the “power of the university or college in its corporate form to determine the means by which its goals and programs will be pursued” (p. 6). Goodchild et al. (1997) believed procedural autonomy allows universities to develop their own unique operations model and set their own priorities.

Since the 1970s, tension between IHEs and governmental agencies has increased due to the complex nature of their relationship. and due to factors considered previously (Newman, 1987; Volkwein, 1987; Berdahl, 1990; Hines, 2000; McLendon, 2002; McLendon, 2002; Hearn & Deaton, 2006). Terenzini (1996) noted that academics in higher education do not understand or care about the intersectionality of IHEs and the government. Hearn and Lacy (2009) expand on Terenzini (1996) by expressing the view that academia has its roots in education, not governmental policy. Altbach et al. (2005) contend that governments ought to stay out of academic matters. Academic autonomy in essence is the authority of IHEs to set curricula, teach those curricula, and conduct research without government interference (Anderson & Johnson,

1998; Estermann, Nokkala, and Steinel, 2011). Hearn and Lacy (2009) defined academic autonomy as "academic professionals' ability to pursue knowledge as they see fit" (p. 947). Further, Hearn and Lacy (2009) noted that academic autonomy revolves around the idea of academic freedom that each faculty member possesses and should not be infringed upon by governmental entities.

Some scholars have discussed the need for some oversight from the government. Aghion et al. (2008) have contended that IHEs benefit from government regulations and concluded that the government should set tuition and fees associated with enrollment, but that IHEs should remain autonomous in all other areas. Longanecker (2008) and Lowry (2004) noted that a focus on revenue and prestige can negatively impact the quality of their undergraduate education. Dee (2006) indicated that autonomy and accountability can coincide by allowing IHEs to remain autonomous if they meet certain state accountability measures. Hutchens (2007) and Berdahl (1971) noted that some government oversight is needed in the area of substantive autonomy.

Measuring Autonomy

Scholars have spent time defining IHE autonomy, but it is also important to understand how autonomy at IHEs is applied and how it is measured. Many scholars, such as (Anderson & Johnson, 1998; Berdahl, 1990; Estermann, Nokkala, & Steinel, 2011; Fisher, 1988; Lowry, 2001b; Volkwein, 1986; Volkwein, 1989; Volkwein & Malik, 1997; Voogt & Volkwein, 1997), have studied autonomy measurement. According to Fisher (1988) autonomy can be measured by legislative acts. For example, some states have governing boards that regulate all action taken by IHEs, but some states have a hands-off approach and allow some flexibility. Aliyeva (2016) noted that most of the autonomy granted by states deals with the mission of the IHE. Austin and Jones (2015) and Berdahl (1990) agreed that most of the autonomy granted by state governing

boards involves substantive autonomy but not operational or procedural autonomy which strips the IHE of any budgetary, financial, or human resources autonomy.

According to Voogt and Volkwein (1997), measuring autonomy should include budgeting flexibility, budget form, expenditure oversight, tuition and revenue control, local taxing and capital authority, and personnel administration. They noted that combining financial and academic flexibility through survey data could be a way to score autonomy. Anderson and Johnson (1998) conducted a study in over 20 countries using survey data where IHEs indicated the level of government intrusion in academics, administration and finance, students and staff, research and publications, and curricula. Another way scholars have looked at autonomy is through the lens of history and politics (Aliyeva, 2016). Dill (2001) concluded that IHEs are operating in the global market and must be able to operate freely to compete. Aghion et al. (2018) stated IHEs should "be autonomous, in the sense of having legal standing, owning assets, having the capacity to contract, to hire staff and set pay, and freedom to set budgets and develop policies of every kind" (p. 50). In essence, to compete in a global market, IHEs must control their fate, at least to some extent. There is considerable research on higher education and operations; however, the literature is limited in terms of whether autonomy creates a more efficient IHE. Connections between autonomy and efficiency merit additional exploration, which is a primary goal of this study.

IHEs in the United States of America are reluctant to study efficiency. Because American IHEs do not research technical efficiency, the cited research base for technical efficiency comes from studies of IHEs outside of the United States. As Andersson et al. (2016) states, "Several European countries are today facing budget cuts. Defining and measuring

efficiency and productivity is of the utmost importance to produce the same amount of output with reduced resources" (p. 205).

Farrell (1957), an authority on the study of efficiency, defined technical efficiency as "Producing maximum output from a given set of inputs. This distinction is quite a natural one, but it has also the merit that most of the difficulties are associated with price efficiency, leaving technical efficiency as a relatively uncomplicated measure" (p. 259). Mayston (1996) defined technical efficiency as "attempts to maximize student learning and organizational policy outcomes while utilizing given sets of financial and human resources inputs" (p. 127). Further, researchers have determined that IHEs function as large bureaucracies and do not operate with optimal technical efficiency (Barnett, 1994; Leven, 1976; Rolle, 2003)

Across Europe, researchers have studied aspects of IHE technical efficiency. Andersson et al. (2016) conducted an efficiency study of 30 IHEs in Sweden over two years. Of the 30 IHEs, half improved their efficiency over the two Andersson et al. years. The paper noted that improved efficiency revolved around undergraduate graduation rates, timely publications from research faculty, and the vast array of education fields offered by the institutions. Andersson et al. (2016) failed to determine what the IHEs did to improve these outcomes. Thanassoulis et al. (2011) conducted a similar study in the United Kingdom to review 121 IHEs over three years. Specifically, the authors looked at a single input that was a combination of operating cost, net resident cost, and catering cost. Outputs included Full-Time Equivalence (FTE), Undergraduate Enrollment, Postdocs, Quality Research and Grants, and miscellaneous income. Thanassoulis et al. (2011) concluded that IHEs in the UK are relatively inefficient in their operation and spending.

Agasisti and Salerno (2007) conducted efficiency research on 52 Italian IHEs. Outputs consisted of student enrollment, Ph.D. students, and external funding for research, and inputs consisted of academic and staff costs and miscellaneous costs. Agasisti and Salerno (2007) determined that efficiency could be determined by your inputs and outputs by stating, "Efficiency scores also vary considerably when measures are input and output based" (p. 455). They concluded that limiting enrollment in some institutions may make for a more efficient university.

Mismatch of IHE Definitions

Aliyeva (2016) described the tension between IHEs and governing bodies by observing how "the priorities of institutors and governments are often mismatched" (p. 15). Financial autonomy has become the primary argument from IHEs in their quest for autonomy (Felt & Glanz, 2002). Further, as Eckel (2008) argued, if states cannot provide adequate funding to IHEs, they should not have a say in decision-making. Volkwein (1986, 1989) commented that public institutions with more autonomy rely less on state funding and acquire more funding on their own than IHEs with more state funding. Building on Volkwein's work (1985, 1989), Eaton (2006) contended that IHEs perform better overall in decentralized environments and IHEs with more institutional autonomy have better institutional performance. Scholars, such as Alexander, 2000; Ewell, Jones, & Kelly, 2003; Zumeta et al., 2012), contend that state governments prioritize accessibility and enrollment, higher graduation rates, and diverse student populations (Alexander, 2000; Ewell et al., 2003; Zumeta et al., 2012). Further, state governments expect institutions to graduate skilled workers (Knott & Payne, 2004; Payne & Roberts, 2002). Leveille (2005) noted that state governments want IHEs to focus on job preparation, graduation rates, and low costs. However, IHEs seek to focus on revenues and prestige.

Public IHEs tend to focus on prestige and research production (Brewer et al., 2004; Leveille, 2005; Mohrman et al. 2008). According to multiple scholars (e.g., Slaughter & Rhoades, 2004; Zusman, 2005, Zumeta et al., 2012), IHEs focus on prestige and research production because it allows for the additional funds needed to carry out the mission of the university (Slaughter & Rhoades, 2004; Zumeta et al., 2012; Zusman, 2005) in a time when state have generally reduced funding as a percentage of the state budget. Zumeta et al (2012) state "the priorities set by most research universities versus public comprehensive universities are research first and graduate education second, with undergraduate education a distant third" (p. 141). Aliyeva (2016) noted that the clear difference between priorities for IHEs and state governments in terms of mission and how to carry out that mission. State governing agencies still insist on overseeing IHE operations even as government spending dwindles (Alexander, 2000). Aliyeva (2016) indicated that research institutions want to focus on research spending and state governments are student focused. A function of state governing boards is to ensure that IHEs are conducting business in accordance with board's wishes (Knott & Payne, 2004). Most states have state governing boards that oversee IHEs in their respective states. These governing boards have the authority to control IHE decisions, financially or operationally (Tandberg, 2013). This oversight behavior by government agencies increases the tensions with IHEs (Dee, 2006; Knott & Payne, 2004; Zumeta et al., 2012).

The state's desire for IHEs and the desires of IHEs differ greatly and produce tension. Furthermore, the government has put pressure on the IHEs leading them to believe that their academic freedom is being infringed upon (Berdahl, 1997). Aliyeva (2016) stated that state governments believe that accountability is their job regardless of how the amount of funding provided by the state, and IHEs believe that autonomy should be awarded due to the lack of

funding. As noted by Aliyeva (2016) IHEs can have accountability standards in conjunction with the state. Aliyeva (2016) stated, "states can enforce accountability policies and still allow institutions to have full discretion over their decisions and actions that are aligned with their missions" (p. 19).

State Funding for Higher Education

Literature on funding policy has been of minor interest for scholars in higher education, but scholars have spent time discussing the politics between state governments and IHEs (Conner & Rabovsky, 2011). According to scholars in higher education, politics play an important role in state appropriations (Delaney & Doyle, 2007; Nicholson-Crotty and Meier, 2003; Tandeberg, 2010). Tandberg (2010) noted that there is a direct relationship between politics and appropriations and that partisanship plays an important role in appropriations and can change depending on what party is in control of state government. Kallison and Cohen (2010) noted that in previous eras, funding was provided to IHEs due to the importance of economic benefit and individual advancement, but as government funding lessens, appropriations are becoming more political.

The decrease in funding for higher education has created performance-based appropriations (Rabovsky, 2012). Aliyeva (2016) noted that the "government allocates funds based on institutional success of meeting state-desired goals" (p. 20). Performance-based funding is not without its issues, according to scholars. Liefner (2003) noted that IHEs will not push the envelope and will avoid projects with a high chance of failure. Further, scholars such as Doughtery et al. (2014) suggested that performance outcomes are set by states and IHEs have no voice in the setting of outcomes, which creates animosity. Aliyeva (2016) indicated that IHEs dependent on states are under the control of state governments and have no way out, however;

there is no research to indicate that performance-based funding has a positive impact on IHE outcomes. Aliyeva (2016) stated, "when institutions compete with each other for resources, they may lower their academic standards or quality to increase performance on their state funding metrics" (p. 21). When IHEs lower their standards, it forces them to cater to state-created outcomes. Moreover, scholars have noted that performance funding by the state government has not led to positive results (Dougherty and Reddy, 2013; Fryar, 2011; Rutherford and Rabovsky, 2012; Shin, 2010).

The Commonwealth of Virginia and Virginia Commonwealth University

Concerning IHEs in Virginia, the move toward autonomy began in the early 1990s (Leslie & Berdahl 1998). From 1990 to 1994, Governor Douglas Wilder and his leadership issued tuition caps, hiring freezes, and discontinued the long process of university quasi-independence (Leslie & Berdahl 2008). This resulted in a backlash from public universities which reached its apex in 2004. Due to the backlash, Governor Mark Warner worked with universities to create the autonomy system in 2004. In 2005 the Commonwealth of Virginia passed the Restructured Higher Education Financial and Administrative Operations Act, which is known as the Restructuring Act. The Restructuring Act created three levels of autonomy for public IHEs in Virginia with Autonomy III providing complete autonomy from the Commonwealth. To receive Autonomy III, each institution must meet 12 goals set by the Commonwealth. If approved, universities operate autonomously within six crucial areas. The Commonwealth of Virginia has 15 four-year public universities, of which six are predominantly research-based.

According to the State Council of Higher Education for Virginia (SCHEV), the chain of command in the Commonwealth of Virginia consists of the Governor, General Assembly,

Attorney General, Secretary of Education, Board of Visitors (BOV), and SCHEV. According to Schultz (2016), SCHEV was founded in 1956 to promote and coordinate higher education in the Commonwealth. Each public university has BOV members appointed by the governor. Schultz noted (2016), "The board is responsible for managing its respective institutions' affairs which include oversight and development of institutional policies, objectives, goals, and leadership of the institution" (p. 34). Furthermore, the BOV is responsible for managing the university's daily operations, approves state appropriations budget requests, and sets the tuition and fees of the university. The Commonwealth developed three levels of authority (autonomy).

All public universities are automatically vested with Level I autonomy and can remain at that level if they choose. Level I autonomy offers minimal operational autonomy and IHEs are under heavy scrutiny by Virginia's government. Level II autonomy allows universities to operate freely within the three areas of capital outlay, information technology, and procurement. Level 2.5 autonomy adds the area of financial and administrative authority. Finally, Level III autonomy allows autonomy in several key operational areas. Under Level III, IHEs have autonomy in the areas of capital outlay, information technology, procurement, human resources, and complete finance authority. Before defining each of the areas of autonomy, it is important to understand what the institutions must do to achieve Level III autonomy.

For IHEs in Virginia to achieve Level III autonomy, universities must adhere to twelve goals set by the Commonwealth. The Commonwealth of Virginia shares each goal and the accompanying definition on its SCHEV website (SCHEV, 2021). In 2008, a two-year review was conducted by the Joint Legislative Audit and Review Commission to the Governor the General Assembly of Virginia entitled *Two-Year Review Initial Higher Education Management Agreements*. Schultz (2016) provided a helpful overview of the autonomous system within the

Commonwealth of Virginia. Specific definitions and rules and regulations from that audit and Schultz (2016) are used here to define all twelve Restructuring Act Goals as well as the six areas of autonomy.

1. IHEs must provide access for all citizens in the Commonwealth, which includes underrepresented groups. SCHEV provides oversight on this goal by demanding that IHEs are per the demand analysis, and meet enrollment projections, and degree estimates.
2. IHEs must ensure that the tuition setting will be honest and respectful of family income and periodically assess how tuition costs impact students.
3. Robust academic offerings, including high-need degrees, are another goal set by the Commonwealth. The IHEs must regularly assess the need for graduates in academic shortage areas. Under this performance goal, universities must address the need for graduates to fill areas with job shortages.
4. To receive autonomy status, IHEs in Virginia must increase their academic standards. Annual reviews and improvement plans are required in this area.
5. Articulation and dual enrollment are another goal issued by the Commonwealth. This goal must be tracked yearly and updated accordingly as enrollment rises.
6. Another goal set by the Commonwealth stresses that IHEs agreements must be made with community colleges to increase the number of community college transfers. Further, under this goal, IHEs must offer dual enrollment opportunities for high school students.
7. Economic development is critical within the plan for autonomy. Under this goal, the IHEs must strive to increase economic development in the area in which the university is located.
8. IHEs must strive to increase the number of research grants, patents, and licenses received.

9. IHEs must work to create a relationship with elementary and secondary schools' administrators, as well as determining a plan to improve student outcomes, upgrade the knowledge and skills of teachers, and increase the leadership skills of school administrators to enhance K-12 education.
10. A six-year financial plan must be submitted by IHEs and approved by the SCHEV.
11. Financial and administrative effectiveness is also mandated by the government. Under this goal, IHEs must conduct business in a way that is efficient and respects government funds. Further, IHEs must use best practices with procurement, information technology, real estate management, as well as use a vast array of suppliers. Further, IHEs seek out businesses and conduct business with organizations owned by women and minorities.
12. Finally, each university must submit a plan to ensure the safety of students on campuses.

The Commonwealth of Virginia has applied an intriguing model in relation to institutional autonomy considerations. On the one hand, IHEs can operate with autonomy if they meet the 12 goals set by the Commonwealth. However, they must conform to this rigorous planning process. Are IHEs merely trading one bureaucratic system for another? That is a question that needs to be examined to determine if autonomy granted by the government has led to a more efficient operating university. To gain a better understanding of autonomy, the autonomy needs to be examined. The Commonwealth of Virginia allows for three levels of autonomy. Each level allows for more autonomy, with Level III allowing for complete autonomy. Each area of autonomy will be considered more below.

SCHEV is responsible for determining which public IHEs receive different levels of autonomy. If an IHE is not certified by SCHEV, then those institutions do not receive consideration for autonomy. According to SCHEV, under the Restructuring Act, all public IHEs

are automatically enrolled in autonomy level I. Level I autonomy does allow for IHEs to have some level of autonomy regarding procurement, leases, and capital outlay, but they are closely monitored by the SCHEV. Level II allows for additional autonomy. With Level II autonomy IHEs create an MOU with SCHEV to remove certain oversight from SCHEV. If all 12 goals are met by a university, they move to level III autonomy where the IHE signs an MOU with the Commonwealth for total autonomy in six key areas and agrees to be monitored by the BOV.

IHEs in the Commonwealth of Virginia are allowed six unique areas of autonomy under level III. Below is a description of all six areas of autonomy for Level III IHEs.

1. One area of the Restructuring Act is for universities to operate their capital outlay projects. Specifically, this process focuses on construction projects and land acquisitions. With this flexibility, Autonomy III institutions are no longer required to bid out specific jobs to choose the lowest bidder. They also no longer have to navigate the bureaucratic process of seeking state approval to renovate buildings, construct new buildings, or purchase new land for the institution. To guide this process, the Commonwealth established certain rules to follow while undergoing capital campaigns. Autonomy III institutions must pass all projects over to the BOV, whose function is to monitor and approve all capital projects. The BOV approves projects, establishes an on-site building official for daily management, assesses environmental concerns, ensures fair market value for land acquisitions, ensures efficient project management, and keeps the government updated on university capital overlay projects.
2. Information Technology (IT) is the second area that the Restructuring Act allows universities to operate freely under Autonomy III. Universities are allowed to control major IT projects with the State Chief Information Officer's approval. As with capital

projects, established rules must be followed to enjoy this freedom. Universities must create an IT strategic plan, submit an annual report, and develop IT policies for audit purposes.

3. The procurement of goods and services is another autonomy area afforded under Autonomy III. Autonomy III institutions are exempt from the Virginia Public Procurement Act that the Commonwealth requires of governmental agencies. Under this area, institutions can purchase goods and services under less scrutiny. Of course, rules are created in this area as well. For example, institutions must make a conscious effort to purchase goods from small, women-owned, and minority-owned businesses (SWAM Model). In addition, institutions must use the electronic procurement system (EVA) provided by the government.
4. The Restructuring Act allows for Autonomy III in lease agreements for real estate property. Under this area, institutions are not required to seek governmental approval when leasing space. As in the other areas, certain rules apply. All leases must be geared toward advancing the universities' mission, as well as consider the actual need for space. University legal counsel must review lease agreements to ensure the agreements adhere to state real-estate law.
5. The fifth area of autonomy granted by the Restructuring Act for Autonomy III institutions is in human resources. The autonomy exempts institutions from the Virginia Personnel Act. IHEs with Autonomy III can set their payroll administration, hiring process, classifications, and promotion practices. This area also allows IHE's to create different retirement plans for employees. The government created several rules for this area as well. The government sets the fringe rate, protects rights and privileges, provides

counseling services, unemployment compensation, and workers compensation, incorporates planning and evaluation processes, and requires reasonable paid leave for holidays, vacation, or other personal uses.

6. The final area of autonomy afforded by the Restructuring Act for Autonomy III institutions is in financial operations and management. This area allows institutions to invest financial resources, which includes general and non-general private funds. There are rules in place that institutions must follow. The financial reporting systems used by the institutions must satisfy requirements for inclusion in the States Comprehensive Annual Financial Report (CAFR). In addition, institutions must report to the Secretary of State any intentions to withdraw from any insurance or risk management program.

According to IPEDS 2019-2020 data, Virginia Commonwealth University (VCU) is located in Richmond, Virginia, and possesses a Carnegie Classification as a Doctoral University with High Research Activity (IPEDS, 2021). VCU has a total enrollment, considered a mid-size public institution. of 30,697 students, making it a mid-sized institution. Currently, 47% of students are white, 8% Hispanic, 18% African American, 13% Asian, 4% non-residential aliens, 3% unknown, and 6% two or more races. Tuition for VCU is $14,596 for instate and $35,904 for out-of-state undergraduate students, respectively. Graduate tuition is $15,086 for in-state students and $29,084 for out of state students. As of 2018, 7,321 individuals were staffed by VCU. Specific to this study, VCU has 883 management, 373 business and financial, and 708 office and administrative support staff for a total of 1,964 individuals that are tasked with administration efforts on VCU's campus.

VCU received Level III Autonomy in 2008, and according to Ohern (2007), VCU applied for Level III to improve several areas of university functionality such as procurement, capital

projects, leasing, information technology, and a complete redesign of their human resources. VCU argued that a redesign of human resources would create visible career paths, professional development and networking opportunities. It also provides merit-based pay for outstanding service to students and faculty and achievements that advance the university's priorities (that they set autonomously), performance evaluations, and transparency and accountability.

The Commonwealth's autonomy system is free from government interference and regulation and IHEs with autonomy are responsible for their own oversight. IHEs in the Commonwealth with Level III autonomy do not have to bid out construction projects. These institutions can also streamline their institutional management, as well as create their own enrollment policies. With these conditions in mind, I hypothesize that Virginia Commonwealth University (VCU), which received Autonomy III status in 2008, will possess a more diverse enrollment, spend less on administrative managers and staff, and spend less on auxiliary enterprises after receiving Autonomy III certification. Further, VCU will possess a more diverse enrollment, spend less on administrative managers and staff, and spend less on auxiliary enterprises than comparative Virginia public IHEs. To research my hypothesis, I will use DCPD data to conduct a longitudinal (2005-2015) study of VCU and comparable Virginia institutions and will address the following research question:

- How do minority enrollment percentages, administrative expenditures percentages, and auxiliary enterprises percentages at Virginia Commonwealth University differ before receiving (2005-2008) and after receiving Autonomy III status (2008-2015)?
- How do minority enrollment percentages, administrative expenditures percentages, and auxiliary enterprises revenue percentages differ between post Autonomy III Virginia Commonwealth University and comparable public IHEs in Virginia?

Conclusion

IHEs have transformed considerably over several decades. From the opening of Harvard in 1636 to the Morrill Act of 1862 to the G.I. Bill, IHEs have had to consistently reinvent themselves. IHEs have entered a new phase of how they operate based on principles and concepts of entrepreneurialism/academic capitalism, a phrase that is based on generating their own funds to be self-sufficient. As IHEs continue to generate funding independents of state support, calls for autonomy will continue. IHEs want the ability to make their own decisions, define their own missions, and hire employees on their own. This chapter also noted that even with decreased funding, state governments still want control of IHEs. State governments desire to control IHEs has led to disagreements on how IHEs should operate. IHEs desire prestige and external funding for research, whereas state governments are often more focused on enrollment figures and graduation rates. Further, state appropriations have become political and partisan in some states. This study will expand on the work of Leslie and Berdahl (2008), Schultz (2016), and Aliyeva (2016) to examine the effectiveness of the autonomy system in the Commonwealth of Virginia.

Chapter 3 – Conceptual Framework and Methodology

This chapter will discuss the conceptual framework and methodology of the study. Specifically, this chapter will present the research questions and hypotheses, and describe the instrument that will be used for data collection, and discuss the variables and statistical analysis to be used for the study.

The primary purpose of this study is to gain a better understanding of autonomy at public IHEs in the Commonwealth of Virginia. This knowledge will assist researchers in learning more about autonomy in higher education. Enhanced knowledge about autonomy in higher education will provide researchers and advocates with more data that will allow for meaningful conversations with state leaders about granting more autonomy to IHEs. This study will also consider the ability of IHEs to generate and carry out their mission with limited governmental influence of the government. Finally, this study will lay the foundation for more research on autonomy in higher education.

IHEs in the Commonwealth of Virginia were chosen as the focal point for this study for two reasons. This study attempts to provide a glimpse into autonomy in a state where IHEs are allowed to operate autonomously based on a system permits varying levels of institutional autonomy. Secondly, Virginia Commonwealth University received Autonomy III status in 2008, which provides adequate pre- and post-autonomy data. Further elaboration on the Commonwealth of Virginia and VCU is discussed in the population section of the study.

Conceptual Framework

The study will employ the Principal Agent Theory (PAT). PAT is appropriate when analyzing the autonomy of Virginia Commonwealth as compared with IHEs in Virginia with little to no autonomy. PAT is based on the delegation of tasks between two entities' resources (Braun & Guston, 2003). One entity possesses a resource (principal actor) but does not possess the ability to complete tasks; therefore, the principal needs an agent to complete a task. In turn, the agent agrees to conduct the business of the principal at an agreed-upon fee, monetary or otherwise. After the agent agrees to complete the task, a relationship/contract develops between the two actors that are controlled by the principal (Braun & Guston, 2003). Within higher education, the state is the principal and the IHE is the agent. According to Lane (2012), typically the actors involved can accept, reject, or terminate the contract; however, in higher education, IHEs are not able to terminate some contracts because the IHE is under the control of the state (Aliyeva, 2016).

As noted in the literature, there is a disagreement on how IHEs should conduct business. State governments require IHEs to focus on education, research, service, enrollment, and graduates' career readiness. IHEs, on the other hand, desire to focus on national and international rankings, prestige, and external funding. Williamson (1985) noted that the principal/agent relationship can create tension because each actor is interested in maximizing "personal welfare" (p. 47). Williamson (1985) also noted that the principal cannot be sure that the agent will perform at the agreed-upon level. With that in mind, Aliyeva's (2016) research noted that state governments cannot monitor the daily operations of IHEs nor do they possess the expertise they are paying the IHE to have. In essence, the state government expects one thing, and IHEs another, leading to conflict and tension.

In addition, PAT exists in two forms, behavior-based and outcome-based. Of the two forms, outcome-based is the form common to higher education. For example, if an IHE does X they receive Y, if they do not achieve X they do not receive Y. As noted in Chapter 2, funding is outcome-based in that IHEs receive the funding from the state for meeting state-required objectives. Importantly, while IHEs have met the outcome-based, state-required objectives, state funding has decreased over the last two decades leaving IHEs desiring more autonomy.

Aliyeva (2016) used PAT to conduct research focused on the relationship between IHEs and state governments. They argued that the principal-agent theory is appropriate because of the contractual relationship that exists between the principal (government) and the agent (IHEs). The state has funding resources as the principal actor and the IHE has knowledge as the agent. IHEs possess knowledge that state governments do not; therefore, state governments must employ agents that possess the knowledge the governments lack (Aliyeva, 2016). Similarly, this study will focus on the relationship between IHEs and state governments; however, this study will seek to determine how autonomy impacts spending patterns, as well as enrollment standards.

Research Questions and Hypotheses

In 2008, Virginia Commonwealth University (VCU) received the highest level of autonomy, Autonomy III, under the Commonwealth of Virginia's Restructuring Act. The researcher hypothesizes that VCU will possess a more diverse enrollment, have fewer administrative managers and staff, and earn more revenue on auxiliary enterprises after Achieving Autonomy III status as well as compared to Autonomy I Virginia public IHEs.

The study will use DCPD data to conduct a longitudinal (2005-2015) study of VCU and Autonomy I Virginia institutions and will address the following research questions:

1. How do minority enrollment percentages, administrative staffing percentages, and auxiliary revenue percentages at Virginia Commonwealth University differ before receiving (2005-2008) and after receiving Autonomy III status (2008-2015)?

   H_{01} = There is no relationship between minority enrollment percentages and Autonomy III at VCU.

   H_{02} = There is no relationship between administrative staffing and Autonomy III at VCU.

   H_{03} = There is no relationship between auxiliary revenue and Autonomy III at VCU.

2. How do minority enrollment percentages, administrative staffing percentages, and auxiliary revenue percentages differ between post Autonomy III Virginia Commonwealth University and comparative public IHEs in Virginia?

   H_{04} = There is no relationship between minority enrollment percentages and post-Autonomy III at VCU and comparative public IHEs in Virginia.

$$Y_{minorityenrollment} = a + B_1 x_{autonomy}$$

   H_{05} = There is no relationship between administrative staffing percentages and post-Autonomy III at VCU and comparative public IHEs in Virginia.

$$Y_{administrative\ expenditures} = a + B_1 x_{autonomy}$$

   H_{06} = There is no relationship between auxiliary revenue percentages and post-Autonomy III at VCU and comparative IHEs in Virginia.

$$Y_{auxiliary\ enterprises} = a + B_1 x_{autonomy}$$

Population

The population of interest consists of one university in Virginia, Virginia Commonwealth University (VCU), and all Autonomy I universities in the Commonwealth. According to Integrated Postsecondary Education Data System (IPEDS) 2019-2020 data, VCU is in Richmond, Virginia, and possesses a Carnegie Classification as a Doctoral University with High Research Activity. In 2019, VCU's enrollment was 30,697 students, which is considered a mid-size public institution. Within that enrollment, 47% of students were white, 8% were Hispanic, 18% were African American, 13% were Asian, 4% were non-residential aliens, 3% were unknown, and 6% were two or more races. Tuition is $14,596 for instate and $35,904 for out-of-state undergraduate students, respectively. Graduate tuition is $15,086 for in-state students and $29,084 for out of state students. As of 2018, VCU had a staff of 7,321. Specific to this study, VCU has 883 management, 373 business and financial, and 708 office and administrative support staff for a total of 1,964 individuals that are tasked with administration efforts on VCU's campus.

VCU received Level III Autonomy in 2008, and according to Ohern (2007), VCU applied for Level III status to improve several areas of university functionality such as procurement, capital projects, leasing and information technology, and a complete redesign of their human resources. VCU argued that a redesign of human resources would create visible career paths, professional development and networking opportunities, merit-based pay for outstanding service to students and faculty, and for achievements that advance university priorities (that they set autonomously), performance evaluations, and transparency and accountability.

VCU was chosen as the investigative IHE due to the longitudinal data analysis opportunity. VCU received Autonomy III in 2008 as opposed to the University of Virginia, Virginia Tech University, and the College of William and Mary, all of which received Autonomy III in 2006. There simply was no pre-data on those IHEs to include in this study. VCU, however, has three years of pre-autonomy data and seven years of post-autonomy data, which will enable the study to include both. Autonomy I IHEs in the Commonwealth were chosen for comparison. The comparison IHEs were used to compare with post-autonomy III VCU. Norfolk State, Christopher Newport University, Longwood University, Old Dominion University, Radford University, University of Mary Washington, Virginia Military Institute, and George Mason University are all four-year public institutions that are considered Autonomy I institutions within the Commonwealth's autonomy system. For that reason, these IHEs have been chosen as the comparison IHEs.

Data Collection and Analysis

The study uses institutional-level data to address the following research questions:

- How do minority enrollment percentages, administrative staffing percentages, and auxiliary revenue percentages at Virginia Commonwealth University differ before receiving (2005-2008) and after receiving Autonomy III status (2008-2015)?
- How do minority enrollment percentages, administrative staffing percentages, and auxiliary revenue percentages differ between post Autonomy III Virginia Commonwealth University and comparative public IHEs in Virginia?

This study will use Delta Cost Project Data (DCPD) panel data to determine how Autonomy III impacts auxiliary revenue, administrative staffing, and minority enrollment. Similarly, to Aliyeva's (2016) study, panel data sources are used to determine how Virginia

Commonwealth University, an IHE with designated Autonomy III status, spends their funds as opposed to IHEs with designated Autonomy I status. Specifically, this study will seek to determine how Autonomy III impacts auxiliary revenue, administrative staffing, and minority enrollment.

While Aliyeva (2016) conducted a panel data analysis using similar panel data Integrated Postsecondary Education Data System (IPEDS) to determine whether IHEs with financial autonomy spend their funds differently than IHEs that do not possess financial autonomy, this study will instead use DCPD panel data. Panel data, sometimes called longitudinal data, is data based on a time series of observations over several years (Hsiao, 1986, 2007). According to Hsiao (2007), three primary factors are contributing to the growth and use of panel data. First, the data are more readily available. As Hsiao (2007) noted, "panel data have become widely available in both developed and developing countries" (p. 2). Secondly, panel data has a greater capacity for modeling the complexity of human behavior. Thirdly, it is a challenging methodology (Hsiao, 2007).

The DCPD was created in 2007 to make the (IPEDS) more usable for longitudinal research (American Institutes of Research, 2017). In 2012 the database was taken over by the American Institutes for Research (AIR), while the National Center for Educational Statistics (NCES) maintained the database. The data stored in the DCPD spans from 1987-2015 (American Institutes for Research, 2017). The DCPD provides data on 184 public IHEs in the United States (American Institutes for Research, 2017). The DCPD database includes data related to enrollment and administrative expenditures, as well as auxiliary expenditures. Further, the DCPD allows researchers to view data regionally, as well as by individual states. Delta Cost Project Data (2017) defines administrators as managers of financial and business operations, as

well as all administrative support provided by the IHE to administrators. Further, DCPD (2017) defines auxiliary enterprises as expenses associated with self-supporting operations that exist to furnish services to students, faculty, and staff. Examples of auxiliary enterprises are residence halls, food services, health services, college unions, stores, parking, landscaping, and faculty housing.

A fixed-effects model will be used to analyze the DCPD data. Generally, there are two ways to analyze panel data: a fixed-effect model and the random-effects model (Heller, 1999; Zhang, 2010). The underlying difference between the two models is that the fixed-effects model assumes that unobserved effects are correlated with independent variables. On the other hand, the random-effects model assumes that there are no correlations (Wooldridge, 2005). Aliyeva (2016) borrowed from Kennedy (1992) by stating that if the whole population has been exhausted the fixed-effects approach is appropriate. In other words, DCPD has exhausted the population of IHEs; thus, the fixed-effects method is the appropriate method for analyzing the panel/longitudinal data used in this study.

A fixed-effects regression model was be used to analyze post-Autonomy III VCU and comparative IHEs. DiD is a data analysis strategy that employs a before and after comparison of policy. A descriptive trend analysis was be used to analyze VCU before receiving Autonomy III status and after receiving Autonomy III status. Several researchers have used DiD to determine the effects of policy change on educational outcomes (Dynarski, 2004; Flores, 2010; Gandara & Rutherford, 2017; Garces, 2013; Long, 2004; and Kane, 1998; Umbricht et al, 2017). Umbrict et al. (2017) noted that DiD has become increasingly popular in exploring the implementation of policy pre-implementation and post-implementation. Garces (2013) noted, “This estimation strategy has been used in several important research studies to document the impact of policy

changes on educational outcomes" (p. 260). The Restructuring Act was passed in 2005 and VCU received Autonomy III in 2008. Therefore, DiD will allow data analysis of VCU before Autonomy III went into effect, as well as after VCU received Autonomy III status. Further, DiD will allow for the comparison of VCU with Autonomy I IHEs in the Commonwealth before and after the Restructuring Act became policy.

Limitations of the Study

This study will use panel data for data collection. The panel data will allow for quantitative methods to be conducted, but this study is limited in several areas. First, the data will only consist of quantitative panel data, and there are no which will not yield the same insights if, for example, a qualitative study had been conducted. Further, the study is using existing quantitative data; therefore, the data will not be randomized. Comparison IHEs were not randomly chosen, but rather chosen based on their non-autonomous status. Further, the study is limited to one state. Currently, there are five IHEs in Virginia with Autonomy III classification; however, VCU is the only IHE in the Commonwealth of Virginia that provides an adequate amount of data before and after receiving Autonomy III. So, this study will only include one Autonomy III IHE rather than all five of the Autonomy III IHEs in Virginia. Further, this study will only use comparison IHEs with Autonomy I status in Virginia which will limit the regional generalizability of the study.

Chapter 4 – Results

This chapter includes a comparison of means at Virginia Commonwealth University (VCU). Three specific questions are explored: How do minority enrollment percentages differ between pre-autonomy VCU and post-Autonomy III VCU? How do administrative and management staff percentages differ between pre-autonomy VCU and post Autonomy III VCU? How do auxiliary enterprise revenue percentages differ between pre-autonomy VCU and post-Autonomy III VCU? Further, these same three questions were explored by looking at minority enrollment percentages, administrative staffing percentages, and auxiliary revenue percentages at post-Autonomy III VCU and comparative public IHEs in Virginia.

First, minority enrollment percentages will be explored, followed by administrative and management staffing percentages, and auxiliary revenue percentages at pre-autonomy VCU and post-Autonomy III VCU. Due to the small sample, when comparing pre-autonomy VCU and post-Autonomy III VCU only descriptive statistics were used for analysis. However, important information was gleaned from comparing pre- and post-Autonomy III data at VCU. With that in mind, this study examined average differences in minority enrollment, administrative and management staffing, and auxiliary revenue from non-autonomy (2006-2008) to post-autonomy III (2009-2015) VCU.

Findings from Minority Enrollment for Pre- and Post-Autonomy III VCU

Due to such a small data set, means were compared to determine the level of correlation between Autonomy III status and minority enrollment. There appears to be a correlation between Autonomy III status and minority enrollment. Post-Autonomy III increased minority enrollment by almost 6%. There are several possibilities for this connection. First, Richmond, Virginia, is a very diverse city. It could be speculated that in the time since VCU received Autonomy III the city became more diverse. Another idea could be that VCU is following the trend in IHEs seeking to increase its diversity in terms of students, faculty, and staff. VCU is a Research I Carnegie classification (RI) university and must keep that designation by conducting a great deal of research. Acquiring funding for research often involves increasing minority recruitment in STEM fields. To maintain their RI designation, VCU could very well be increasing their minority funding due to acquiring grants that have that specific call.

The common trait about all the descriptive data above is that VCU has increased its percentage of minority student enrollment since receiving Autonomy III. Future research is needed in this area to determine the influence that Autonomy III has on minority enrollment. Currently, there is not enough data to determine the extent of that influence, however, something is working at VCU to increase minority enrollment. Table 1 provides descriptive statistics for minority enrollment pre-Autonomy and post-Autonomy III at VCU.

Table 1

Pre-Autonomy and Post-Autonomy III VCU Minority Enrollment Means

Status	N	Mean	SD
Pre Autonomy	3	29.15	.360
Post Autonomy	7	35.01	3.33

Findings from Administrative/Management Staffing for Pre- and Post-Autonomy III VCU

Pre-autonomy and post-Autonomy III means were also compared for administrative and management staffing. Similar to minority enrollment, there was a decrease in administrative and management staffing post-Autonomy III at VCU compared to pre-Autonomy III. However, there could be other reasons for the decrease and since no statistical analyses were run on this data those possibilities must be discussed. Funding for IHEs, as discussed throughout, has decreased over the decades and that could have a bearing on administrative staffing. As funding for IHEs goes down so do the financial capabilities to hire the appropriate number of staff. With the absolute spending control that Autonomy III provides, it is impossible to determine the exact reasoning for the decrease, one result could be a reduction in staffing levels.

However, the data show that there has been 2.86% decrease in administrative and management staffing at VCU post-Autonomy III. Something triggered this decrease and while not conclusive, it is possible that autonomy status played a role in the decrease in administrative and management staffing. Free from the bureaucracy formed by government oversight, VCU possesses the ability to staff the university in the most efficient way possible, so Autonomy III could have sought to implement staffing reductions in certain areas. More research is needed to determine the role that Autonomy III played in this decrease, but there is evidence that

something happened post-Autonomy III that led to a decrease in administrative and management staffing. However, being that there are no statistical analyses to back that claim the null hypotheses that there is no relationship between Autonomy III and administrative and management staffing. Table 2 shows descriptive statistics concerning administrative and management staffing pre- and post-Autonomy III at VCU. While a relationship could exist based on the mean comparison, statistical analyses does not establish the hypothesis, so that the null hypothesis is accepted.

Table 2

Pre-Autonomy and Post-Autonomy III VCU Administrative and Management Staffing Means

Status	N	Mean	SD
Pre Autonomy	3	7.55	2.61
Post Autonomy	7	4.69	.035

Findings from the Auxiliary Revenue for Pre- and Post-Autonomy III at VCU

Again, due to the small data set, a statistical analysis was not conducted, but means were compared to determine the relationship between pre-autonomy auxiliary revenue and post-autonomy III auxiliary revenue at VCU. Pre-autonomy VCU had a mean auxiliary revenue of 35.01% and a standard deviation of 13.08 from 2006-2008. VCU had 23.58% mean auxiliary revenue from 2009-2015 and a standard deviation of 15.49.

Clearly, there appears to be some relationship between post-Autonomy III VCU and auxiliary revenue. The extent of that relationship is unknown, but a relationship exists. Several ideas about the reasons for this change are possible. One idea is that these changes occurred because VCU had more freedom to purchase goods and services in a way to be more responsive

leading to a decrease in auxiliary revenue post-Autonomy III. Another possibility is that pre-Autonomy VCU accepted the lowest bids for its auxiliary enterprises, whereas post-Autonomy III, VCU paid more for what they believed to be a better service. Further, post-Autonomy III VCU could have kept auxiliary price relatively consistent to pre-Autonomy VCU creating a smaller amount of revenue. However, this change in revenue could be unrelated to autonomy in any capacity. Future research is needed as there is a definite correlation that could help identify the potential relationship between Autonomy III at VCU and auxiliary revenue. Table 3 provides descriptive statistics for pre-autonomy auxiliary revenue and post-Autonomy III revenue at VCU. In this specific case, the null hypothesis that there is no relationship between auxiliary revenue and autonomy is accepted, due to the lack of statistical analysis. However, there is a relationship worth exploring further and when comparing VCU to its non-autonomous counterpart, as noted in that section below, VCU has more auxiliary revenue than its non-autonomous counterparts in Virginia.

Table 3

Pre-Autonomy and Post-Autonomy III VCU Auxiliary Revenue Means

Status	N	Auxiliary Revenue Mean	SD
Pre Autonomy	3	35.01	13.08
Post Autonomy	7	23.58	15.49

Findings from Post-Autonomy III VCU and Comparative IHEs Minority Enrollment

Dummy coding was used to create variables that would allow for fixed-effects regression analysis to be conducted between Virginia Commonwealth and non-autonomous, comparative IHEs in Virginia. The Delta Cost Project Database (DCPD) (2017) provides data on IHEs

enrollment in terms of total enrollment and by race. For this analysis, a variable was created that tallied the percentage of minority enrollment at each IHE. Minority enrollment included American Indian, Asian, Black, Hispanic, and multi-race students. A simple linear regression was conducted to test the null hypothesis that there is no relationship between minority enrollment at post-Autonomy III VCU and comparative IHEs in Virginia. Descriptive statistics are reported in Table 4. Minority enrollment was normally distributed. Standardized residuals were also normally distributed. Scatter plots and histograms were analyzed and no curvilinear relationships between the criterion variable and the predictor variables were evident.

Table 4

Descriptive Statistics for Comparative IHES and VCU Minority Enrollment

	Mean Percentages (2009-2015)	SD	N
Minority Enrollment No Autonomy	28.99	23.28	90
Minority Enrollment Autonomy (VCU)	32.12	24.42	10

There was a statistically significant relationship between minority enrollment and autonomy, $F(8,81) = 441.74$ $p < .001$. A large effect size was noted with approximately 98% of the variance accounted for in the model $R^2 = .978$. In essence, when analyzing minority enrollment over 10 years (2006-2015) there was a statistically significant increase in minority enrollment at post-Autonomy III VCU compared to the non-autonomous IHEs. Therefore, the null hypothesis was rejected. Table 5 reports the finding from the analysis:

Table 5

Linear Regression Results for Minority Enrollment

Predictor	B	SE B	*t*	*p*
Autonomy Status	33.254	1.155	28.787	.000

* $p < .05$

Minority enrollment shows VCU with a significantly more diverse enrollment than its comparison schools. Autonomy III IHEs in Virginia are allowed to set their admission requirements. Non-autonomous IHEs must adhere to admission requirements set by the Commonwealth. Autonomy could certainly play a role in a more diverse enrollment; however, it is important to look at all factors of VCU's enrollment. The city of Richmond, Virginia has a population of 226,210 according to the 2020 census. Of the 226,210 people residing in Richmond, 59% are a minority as defined by DCPD. This suggests that Richmond is a diverse population, which could contribute to a more diverse enrollment at VCU compared to other Virginia IHEs.

VCU created the Office of Institutional Equity, Effectiveness, and Success (IEES) in 2013. Dr. Aashir Nasim, Vice President of IEES, stated, "diversity is among our greatest assets at VCU, and our effort to create and sustain an equitable inclusive environment is the best approach toward leveraging this assist into universal excellence and success." VCU is committed to diversity, and it could be that VCU would be committed to a diverse student population without autonomy, so it is important to mention that programs existed to create a diverse student population and those programs could have an effect on the student population.

IHEs around the United States are committed to creating a diverse student body and preparing those students to be productive members of society. The government believes that they are the ones that must seek those outcomes and IHEs cannot produce those outcomes

without government influence. However, as VCU has shown, IHEs can be committed to diversity without government intervention in their affairs. IHEs do not need constant oversight to ensure their commitment to integrity and they do not need government oversight to ensure that they reach a diverse student body, they are more than able to produce those outcomes free of the government.

Findings from Post-Autonomy III VCU and Comparative IHEs Administrative and Management Staffing

Dummy coding was used to create variables that would allow for fixed-effects regression to be conducted between Virginia Commonwealth and non-autonomous, comparative IHEs in Virginia. The Delta Cost Project Database (DCPD) provides data on IHEs staffing in terms of total IHE employees and administrative and management staff included as a separate data point. For this analysis, a variable was created that tallied the percentage of administrative and management staffing at each IHE. A simple linear regression was conducted to test the null hypothesis that there is no relationship between administrative staffing and Autonomy III. Descriptive statistics are reported in Table 6. Administrative and management staffing was normally distributed. Standardized residuals were also normally distributed. Scattered plots and histograms were analyzed and no curvilinear relationships between the criterion variable and the predictor variables were evident.

Table 6

Descriptive Statistics for Comparative IHES and VCU Administrative and Management Staff

	Mean	SD	N
Administrative Management Staff No Autonomy	6.63	6.88	90
Administrative Management Staff Autonomy	7.56	6.24	10

There was a statistically significant relationship between administrative and management staffing and autonomy, $F(8,81) = 2.450$ $p < .05$. A small effect size was noted with approximately 20% of the variance accounted for in the model $R^2 = .195$. In essence, when analyzing administrative and management staffing over 10 years (2006-2015) there was a statistically significant increase in administrative and management staffing at VCU when compared to other IHEs in Virginia. Therefore, the null hypothesis was accepted. Table 7 reports the finding from the analysis.

Table 7

Linear Regression Results for Administrative and Management Staff

Predictor	B	SE B	*t*	*p*
Autonomy Status	5.546	2.048	2.708	.008

* $p < .05$

The study revealed that VCU had significantly more administrative and management staff. However, there could be several reasons for this not related to possessing Autonomy III. First, VCU has a Research I Carnegie classification (RI), which is the highest level of research distinction a university can possess. A RI university is charged with being a leader in research in the United States. Being an RI requires large amounts of grant applications and those grants

must be managed and staffed. It could be that VCU had to hire more administrative and management staff in research offices to process awards on the pre-award side and manage those awards afterward. Also, procurement offices would need a large staff to manage the influx of spending from grants. Further, individual schools or colleges at IHEs are asked to submit and manage more grants creating a need for additional grant management. Other reasons, of course, could have accounted for the increase in administrative and management staff. The possibility of increasing staff could be also be due to a negative outcome of autonomy in the sense that lack of oversight could have led to less scrutiny in hiring or the number of administrative staff positions needed. There is also the possibility that the identified correlation did not have any type of causal connection. However, the data indicate the possibility for some type of causal connection between heightened autonomy status for VCU and administrative and staff levels.

Findings from Post-Autonomy III VCU and Comparative IHEs Auxiliary Revenues

Dummy coding was used to create variables that would allow for fixed-effects regression to be conducted between Virginia Commonwealth and non-autonomous, comparative IHEs in Virginia. The Delta Cost Project Database (DCPD) (2017) defines auxiliary enterprises as expenses associated with self-supporting operations that exist to furnish services to students, faculty, and staff. Examples of auxiliary enterprises are residence halls, food services, health services, college unions, stores, parking, landscaping, and faculty housing. A simple linear regression was conducted to test the null hypothesis that there is no relationship between auxiliary revenue at post-Autonomy III VCU and comparative IHEs in Virginia. DCPD provides the percent of an IHE's revenue that comes from auxiliary enterprises. The percentage takes IHE revenue and auxiliary revenue and calculates what percentage is auxiliary. That percentage was used to determine the increase or decrease in auxiliary revenue between the years 2006-2015 for

the IHEs in the study. Descriptive statistics are reported in Table 8. Auxiliary revenue was normally distributed. Standardized residuals were also normally distributed. Scatter plots and histograms were analyzed and no curvilinear relationships between the criterion variable and the predictor variables were evident.

Table 8

Descriptive Statistics of Comparative IHEs and VCU Auxiliary Revenue by Revenue Status

	Mean	SD	N
Percentage of Auxiliary Revenue with No Autonomy	23.76	22.79	90
Auxiliary Revenue Autonomy	24.56	28.82	10

There was a statistically significant relationship between auxiliary revenue and autonomy, $F(8,81) = 17.960$, $p < .001$. A large effect size was noted with approximately 64% of the variance accounted for in the model, $R^2 = .639$. In essence, when analyzing revenue over 10 years (2006-2015) there was a statistically significant increase in auxiliary revenue for VCU when compared to non-autonomous IHEs in Virginia. Table 9 reports the findings from the analysis. Therefore, the null hypothesis is rejected that there is no relationship between auxiliary revenue and post-Autonomy III VCU.

Table 9

Linear Regression Results for Auxiliary Revenue

Predictor	B	SE B	*t*	*p*
Autonomy Status	27.009	4.536	5.955	.000

* $p < .05$

Analysis involving auxiliary revenue shows a significant increase in revenue for VCU as compared to non-autonomous IHEs in Virginia. The data shows that there is something positive about receiving Autonomy III in Virginia. However, there could be other factors to increased auxiliary revenues that are worth exploring. IHEs with Autonomy III status in Virginia do not have to bid out contracts for any job involving auxiliary expenditures. Further, they are allowed to set their prices for those services. It must be noted that this could also influence auxiliary revenue as VCU could contract auxiliary expenditures cheaply and charge higher rates. Put another way, if VCU contracted with a construction company to build a new fraternity house on campus, depending upon the amount of the contract, VCU sets their dues for fraternities and sororities. It is possible that VCU chose a cheaper contract and charged higher prices to their students.

DCPD calculates auxiliary revenue to include the amount of money students, faculty, and staff pay for auxiliary services. As an Autonomy III institution, VCU not only can hire and pay doctors as they see fit for example, but they are also able to charge whatever price they want. Further, Autonomy III IHEs in Virginia possess the ability to charge higher prices for books, room and board, and food services. All of which, as defined by DCPD, are auxiliary expenditures and be counted toward auxiliary revenues. While the initial results for the regression on auxiliary revenues showed a significant increase in revenue for VCU over its non-autonomous comparison schools, more research is needed to further determine the effect of autonomy within IHEs. A deeper dive into VCU's auxiliary expenditures and revenues is needed to gain a clearer understanding of auxiliary enterprises.

Summary

This section analyzed three different outcomes variables. Minority enrollment, administrative and management staffing, and auxiliary revenue were analyzed to determine the effectiveness of autonomy at VCU. I hypothesized that VCU would have a more diverse enrollment, less administrative and management staffing, and more auxiliary revenue when comparing pre-autonomy VCU and post-Autonomy III VCU. Further, I hypothesized post-Autonomy III VCU would have a more diverse enrollment, less administrative and management staffing, and higher auxiliary revenue compared to non-autonomous IHEs.

Post-Autonomy III VCU possessed a more diverse enrollment and had less administrative and management staff than pre-autonomy VCU. However, post-Autonomy III VCU generated less auxiliary revenue than pre-autonomy VCU.

Auxiliary revenue was significantly more at VCU than at non-autonomous IHEs in the Commonwealth. Also, VCU possessed a significantly more diverse enrollment than non-autonomous IHEs in the Commonwealth. However, VCU also employed a significantly larger number of administrative and management staff than the non-autonomous IHEs.

However, it cannot be certain that Autonomy III alone was the primary reason for the results in this chapter. With that in mind, other possible avenues were discussed that may have played a role in the outcomes. It is important to know that outcomes can be influenced by forces that are not associated with the study. Chapter 5 will discuss these findings and what it means for the future on IHEs not only in the Commonwealth of Virginia but in the United States.

Chapter 5-Discussion

The purpose of this study was twofold. First, this research was conducted to gain a better understanding of the autonomy status of IHEs in the Commonwealth of Virginia that was created when the legislature passed the Virginia Restructured Higher Education Financial and Administrative Operations Act (2005). Secondly, this study sought to explore what potential effect, if any, autonomy had on auxiliary enterprises, minority enrollment, and administrative and management staffing. The Restructuring Act of 2005 changed the landscape of IHEs operations, and this topic has received little attention, so this research sought to gain a better understanding of this policy and its effect on IHEs in the Commonwealth of Virginia.

Utilizing the DCPD panel data, this study applied the fixed-effects model to determine how Autonomy III status impacted auxiliary spending, administrative spending, and student enrollment. Difference-in-Differences (DiD) was used to analyze data to compare post-Autonomy III VCU and comparative non-autonomous Virginia IHEs. DiD is a data analysis strategy that employs a before and after comparison of policy. Several researchers have used DiD to determine the effects of policy change on educational outcomes (Dynarski, 2004; Flores, 2010; Gandara & Rutherford, 2017; Garces, 2013; Kane, 1998; Long, 2004; Umbricht et al., 2017). Umbrict et al. (2017) noted that DiD has become increasingly popular in exploring the effects of policies pre-implementation and post-implementation. The study employed the Principal-Agent Theory (PAT) to provide a conceptual framework for this study of autonomy legislation in Virginia. PAT is based on the delegation of tasks between two

entities' resources (Braun & Guston, 2003). The remainder of this chapter is organized into four sections: 1) discussion of results, 2) implications, 3) limitations and 4) conclusion.

Discussion of Results

The PAT suggests that when a principal hires an agent to do a certain job, the principal may overreach in the affairs of the agent. In this case, the principal (government) hires the agent (IHEs) to perform a mission that the principal cannot complete (Braun & Guston, 2003). However, as noted in the literature there are often disagreements between the principal and the agent about the agent's mission (citation). State governments want IHEs to focus on education, research, service, enrollment, and career readiness. However, IHEs believe their mission should revolve around national ranking, prestige, and external funding. As Williamson (1985) noted, there is no trust between the two entities, and this leads to increased tensions. Further, as noted in the literature, funding for IHEs decreased tremendously in the past few years and has left IHEs seeking alternative ways to fund their mission. As Aliyeva (2016) noted, state governments can't monitor the daily operations of IHEs and when they attempt to do so, it leads to IHE frustration, mistrust, as well as a bureaucratic system that does not operate efficiently.

As noted previously in the literature review, with tensions increasing, the Commonwealth of Virginia passed legislation allowing IHEs in Virginia to acquire Autonomy III status. Autonomy III allows IHEs in the Commonwealth to operate free of government and bureaucratic involvement. In 2005, the Commonwealth of Virginia passed the Restructuring Act that fundamentally changed higher education in Virginia. Virginia Commonwealth University (VCU) received Autonomy III status in 2008. This researcher hypothesized that post-Autonomy III VCU would have a more diverse enrollment percentage, a smaller percentage of administrative and management staffing, and smaller revenue percentages from auxiliary

enterprises compared to its pre-autonomy years. Further, the researcher hypothesized that VCU would have these same changes when compared to Autonomy I IHEs in Virginia. Using these hypotheses to guide the research, this study provides several interesting results.

Related to hypotheses one and four, the results are quite impressive. For hypothesis one, there was an increase of 5.86% in minority enrollment between pre-autonomy VCU and post-Autonomy III VCU. For hypothesis four, VCU had a 3.3% higher minority enrollment than non-autonomy counterparts. These results are statically significantly at the .05 level. In considering these two results, one might surmise that Autonomy III status is a reason for higher minority enrollment; however, one must also consider other potential reasons for the increase in minority enrollment at VCU. The city of Richmond, VCU's home, is 59% minority individuals. This diverse population could be a reason for the higher minority enrollment. Further, VCU has several programs with a mission to promote and increase diversity on campus which could serve as a possible reason for the increase in diverse enrollment. This research indicated that VCU possessed higher minority enrollment, both when comparing pre-autonomy VCU and post-Autonomy III VCU and when comparing post-Autonomy III VCU with non-autonomous IHEs in Virginia. However, autonomy could be the cause of the minority enrollment increase as well. IHEs intrinsically want diversity and do not need government demanding they increase minority enrollment. Further, VCU can create new centers and new programs without going through the bureaucratic paperwork necessary that non-autonomous IHEs must go through to create new programs. These results warrant more research.

Related to hypothesis two the results indicate a positive relationship between autonomy and administrative and management staffing. When comparing pre-autonomy VCU with post-Autonomy III VCU, there was a 2.86% decrease in administrative and management staffing after

VCU received Autonomy III. This finding suggests a relationship between Autonomy III status and administrative and management staff numbers. Even though the result is positive, there could be reasons for this result not necessarily related to autonomy. As discussed throughout this dissertation, funding for IHEs has decreased over the past two decades. With government funds diminishing, VCU likely monitored their spending practices more closely. On the other hand, autonomy cannot be discredited for this decrease. Free from government oversight, VCU was able to hire staff only as necessary for completing the institution's mission. Perhaps VCU decided that unnecessary administrative and management staff members were hired; therefore, the institution discontinued overspending in that area.

For hypothesis five, the researcher hypothesized that autonomy would result in less administrative and management staffing; however, the data does not support that hypothesis. Post-Autonomy III VCU possessed more administrative and management staff compared to their non-autonomous counterparts at a .05 statically significant level. There could be a myriad of reasons not related to autonomy that led to this result. First, VCU is an RI IHE, which means that VCU is one of the top research IHEs in the United States. Being a RI likely requires more administrative and management staffing, so it could be that research-heavy IHEs require more administrative and management staffing. It is plausible that VCU had to hire more administrative and management staff in research offices to process grant submissions, as well as manage grant awards. Further related to the RI status, these IHEs likely require more staff in procurement offices to manage and facilitate the influx of purchases that are necessary to conduct funded research. In addition, individual schools or colleges within IHEs are required to submit more grant proposals within RI status and, thus creating a need for additional grant

management staff. In essence, VCU had a large presence of administrative and management staff because these staff are necessary, not because VCU abused the Autonomy III status.

Hypothesis three compared pre-Autonomy VCU with post-Autonomy III VCU concerning auxiliary revenue. The researcher hypothesized that post-Autonomy III VCU would have higher auxiliary revenue. In fact, the results were not as hypothesized. VCU experienced an 11.43% decrease in auxiliary revenue. There are a couple of reasons for this surprising result that are unrelated to autonomy. First, VCU does not have a governmental agency closely monitoring its expenditures. VCU may be spending its revenue in extravagant ways. Another explanation for this decrease could be that pre-autonomy VCU was required to accept the lowest bid for services as a part of the state procurement process. Since Post-Autonomy III does not have this oversight, it is reasonable to speculate that VCU could have accepted more expensive bids for what they perceived as better-quality services.

In hypothesis six, the researcher hypothesized that Autonomy III VCU would possess higher auxiliary revenue when compared to its non-autonomous counterparts. The results are promising as VCU possessed more auxiliary revenue when compared to its non-autonomous counterparts at the .05 level of statistical significance. These results support a positive relationship between Autonomy III status and auxiliary revenue. A possible reason for this positive relationship is that Autonomy III allows VCU to operate completely free of governmental oversight and conduct business as it deems necessary. This freedom appears to have a positive effect on VCU's ability to create revenue from auxiliary enterprises. It is also important to discuss other possibilities for this increase in revenue. Autonomy III allows VCU the ability to pay entities for services without bidding those services out to multiple vendors, and allows VCU to set the prices for those services. The positive results in findings could be due to

VCU hiring cheaper vendors for providing these services and then charging higher prices. When you consider all the areas that are within auxiliary expenditures, it must be noted that other factors could have impacted VCU's increased revenue after receiving Autonomy III status. These results are promising, and more research is needed in this area.

This study sought to gain a better understanding of autonomy at VCU, both when comparing pre-autonomy VCU with post-Autonomy III VCU and when comparing post-Autonomy III VCU and comparative non-autonomous IHEs in the Commonwealth of Virginia. Several interesting findings related to the researcher's hypotheses were noted. The impact of autonomy on IHEs is an area with little research, thus, IHEs have little evidence to utilize when making decisions about seeking autonomy status. This study provided key insight into autonomy, and the results could have implications for the future of higher education.

Implications

Based on this research, there are clearly multiple correlations between autonomy and how IHEs operate. To date, there are only two other studies that have analyzed autonomy in the Commonwealth of Virginia. Leslie and Berdahl (2008) conducted a study to determine what autonomy would mean for IHEs and how IHEs determined their goals with no government oversight. However, this research is nearly thirteen years old, and only three IHEs in the commonwealth had Autonomy III status at the time of publication. Schultz (2016) conducted a qualitative case study and determined that IHE administrators at Autonomy III IHEs in Virginia had positive opinions about Autonomy III, but this research was conducted five years ago. Since Schultz's case study research (2016), little attention has been paid to autonomy. Both Leslie & Berdahl (2008) and Schultz (2016), along with this dissertation, found promising results about the provision of autonomy for IHEs. There is still very little attention given to the idea, and the

implications related to autonomy in higher education are important for the future of IHEs in America.

Three initial IHEs in Virginia received immediate Autonomy III status upon the passage of the legislation. Virginia Commonwealth University received Autonomy III status in 2008 and the final institution, James Madison University, received Autonomy III in 2019 after failed attempts in 2009 and 2016. As of this research, five other institutions attempted to reach Autonomy III but were denied. It is important to determine why universities in the Commonwealth continue to seek Autonomy III approval, as well as the impact of Autonomy III on IHEs and how researchers can measure that impact.

First, it is important to determine why Virginia IHEs continue to seek Autonomy III. One possible explanation is related to the role that prestige plays. Certainly, all IHEs wish to be labeled as one of the top IHEs in America, so perhaps IHEs in Virginia desire to continue to pursue Autonomy III to receive a more prestigious label. Because states and IHEs differ on what an IHE's mission and vision should be, the relationship between IHEs and state are consistently strained. The IHEs' focus on prestige and research production creates divisiveness with the government (Brewer et al., 2004; Leveille, 2005; Mohrman, MA, & Baker, 2008). Further, IHEs place their priority on prestige and research due to the lack of state government funding (Slaughter & Rhoades, 2004; Zumeta et al., 2012; Zusman, 2005).

The focus on prestige and research is likely the reason that IHEs in Virginia continue to seek autonomy. James Madison applied for Autonomy III multiple times since the Restructuring Act passed and finally received the status in 2019. The reasons for their constant desire for autonomy could mean multiple things. First, it could be that they want to

be mentioned in the same light as the other Autonomy III IHEs in the Commonwealth. Higher education scholars must continue to research autonomy in Virginia to determine if autonomy is a worthwhile endeavor or if it is related to IHEs simply wanting to be listed among elite institutions.

Another important implication that will require additional research is related to what autonomy means within IHEs. Ideally, research is needed to determine if autonomy results in a more efficient IHE operation. Perhaps in pursuit of autonomy, IHEs simply trade the state-directed bureaucratic system for a self-imposed bureaucratic system. In theory, the primary reason for autonomy is to free IHEs from the bureaucratic rules and regulations that impede efficient operation. These results provide some support for the argument that IHEs do not necessarily need the state-directed bureaucratic system to operate efficiently. For example, VCU saw an increase in minority student enrollment when compared to the non-autonomous IHEs in Virginia. VCU did not need the governmental rules and regulations to improve diversity within its enrollment. IHEs intrinsically want a diverse student population and do not need to navigate bureaucratic rules. With that said, researchers should explore the process that IHEs use to create their own rules and regulations when granted Autonomy III status. Because these results point to positive aspects of Autonomy III status, more research is needed to describe the characteristics associated with each Autonomy III IHE and to determine characteristics that are linked to more efficient IHE operations.

There is some evidence that Virginia IHEs with Autonomy III status operate more efficiently than non-autonomous IHEs (Schultz, 2016). Unfortunately, studies of IHEs in the United States and efficiency are limited. Most research about efficiency and IHEs was

conducted about technical efficiency and has focused on institutions Europe (Andersson et al. 2016). This study suggests the value of continuing research into potential relationships between autonomy and outcomes in IHEs, including in relation to (2016) state that, "defining and measuring efficiency. As a threshold issue, future research could help us to better understand how to best measure IHE efficiency. Perhaps it is best measured by comparing the number of IHE policies before receiving autonomy to the number of IHE policies created after receiving Autonomy III status across different departments in the IHE. For instance, if the IHE was required to adhere to 25 procurement rules and regulations by the governmental agency before autonomy was granted; and after receiving autonomy, the IHE created 15 procurement rules and regulations. Currently, the relationship between autonomy and efficiency is uncertain. More research is necessary to determine the efficiency of autonomy in higher education.

This study provides compelling evidence for an IHE autonomy system in the United States. Autonomy could change the landscape of how IHEs operate in the future. With dwindling government funds, IHEs are interested in making their own decisions; however, a lack of research in this area prevents IHEs from having the evidence to advocate for autonomy. It is imperative for scholars in higher education to become interested in this area to determine what effect autonomy has on efficiency in higher education. This study provides data that suggests IHEs can operate with government intrusion. Further, is shows that IHEs are intrinsically cognizant of diversity and financials. IHEs do not need government to tell them how to operate. IHEs are a place where diverse individuals come together to learn and think. IHEs do not need government demanding certain outcomes that

they would be working toward without government intrusion. Perhaps, this dissertation might be an impetus for a conversation about autonomy and IHE efficiency.

Limitations

This study used panel data for data collection. The panel data allowed for quantitative methods to be conducted, but this study is limited in several areas. First, the data only consisted of quantitative panel data, and there are no qualitative methods in the study. By limiting the study to quantitative data, this study limited in the depth of understanding and context of what is happening. In order to determine the effectiveness of autonomy and to gain a deeper understanding of the results, a mixed-methods approach that combines qualitative and quantitative data would be more advantageous. Further, the study used quantitative, existing data; therefore, the data was not randomized. Randomized studies create a more scientific study, and the results from those studies have more credibility than non-randomized studies. Comparison IHEs were chosen due to their autonomy status and not by randomization. Future studies should include randomization to gain a better understanding of autonomy.

Further, the study was limited to one state. Currently, there are five IHEs in Virginia with Autonomy III classification; however, VCU was the only IHE in the Commonwealth of Virginia that provided an adequate amount of data before and after receiving Autonomy III. As a result, this study included one Autonomy III IHE rather than all five of the Autonomy III IHEs in Virginia, therefore limiting the generalizability of the study. More research is needed that incorporates all the Autonomy III IHEs in Virginia. It is critical to gain an understanding of what autonomy means to each IHE and to determine if there is a correlation between the Autonomy III IHEs and actual autonomy.

Further, this study used comparison IHEs with Autonomy I status in Virginia which limited the regional appeal of the study. IHEs with Autonomy I status are no different than IHEs in other states that are subject to the rules and regulations of the state. Research needs to include other states and regions to gain a more complete understanding across the United States of America related to what autonomy might mean for IHEs. Each state operates differently, and some states do have versions of autonomy. The Commonwealth of Virginia is the only state where IHEs can govern themselves completely. Autonomy III IHEs in Virginia possess the complete control over their financial and operations. Some states, do possess some autonomy. For example, Michigan possesses some financial autonomy, however; they do not possess to level of autonomy that IHEs in Virginia with Autonomy III receive. More research is needed to determine how IHEs in Virginia compare to other IHEs in the United States.

Conclusion

This study falls in line with Leslie & Berdahl's (2008) case-study data about the initial repercussion of the Restructuring Act of 2005. Leslie & Berdahl (2008) found that the first few years were promising in terms of easing IHEs of state-driven bureaucratic rules and regulations. No other research was conducted until Schultz's (2016) qualitative study. Schultz interviewed faculty, staff, and administrators at Autonomy III institutions and found that autonomy was popular at those IHEs. The current study indicates that freedom from government oversight potentially affects the ways in which a college or university operates. For example, IHEs do not need government agencies mandating a more diverse enrollment or requiring procurement rules for choosing the companies or vendors for campus projects. Further, IHEs do not need large amounts of administrators and managers on campus. IHEs

are intrinsically motivated to complete their missions, so it should not be a surprise that VCU created revenue from its auxiliary enterprises or that it is has a higher minority enrollment than non-autonomous IHEs in Virginia. Further, it should come as no surprise that when comparing pre-autonomy VCU to post-Autonomy III VCU that VCU appears to be more efficient after receiving autonomy.

A primary conclusion from this study is that IHEs do not require government oversight to ensure that they operate correctly. VCU is financially stable with a diverse student population. Governmental oversight would likely not help VCU become a higher-quality institution. IHE administrators have visions and distinct missions for their institutions, and they quite possibly do not need such overbearing governmental oversight. For example, the government is not the only entity that wants to embrace diversity and have a diverse student body that is representative of the United States. The government is not the only entity that believes that IHEs should be for career readiness. The government is not the only entity that wants to use money wisely. These beliefs are widespread in our society; thus, IHEs do not need the government to dictate how they operate. It is clear from the study and the previously mentioned research, that there is certainly something positive about autonomy in higher education. The extent of that positive relationship is yet to be investigated. Scholars in the United States should embrace this topic and seek to gain a better understanding of how autonomy influences IHEs operation and efficiency. Until this subject is taken seriously, the principal-agent relationship will continue to exist and will result in the continuation of a contentious relationship between the government and IHEs. Virginia offers a perfect system to study autonomy, so scholars must answer the call to research this important topic.

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List of Appendices

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Regression

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Descriptive Statistics

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UMW	.1111	.31603	90
LU	.1111	.31603	90
GMU	.1111	.31603	90
CNU	.1111	.31603	90

Correlations

		PercentageofAuxRevtoAuxExpenditures	VMI	RU	ODU	NSU	UMW
Pearson Correlation	PercentageofAuxRevtoAuxExpenditures	1.000	-.654	-.076	.372	.272	-.160
	VMI	-.654	1.000	-.125	-.125	-.125	-.125

	RU	-.076	-.125	1.000	-.125	-.125	-.125
	ODU	.372	-.125	-.125	1.000	-.125	-.125
	NSU	.272	-.125	-.125	-.125	1.000	-.125
	UMW	-.160	-.125	-.125	-.125	-.125	1.000
	LU	-.083	-.125	-.125	-.125	-.125	-.125
	GMU	.142	-.125	-.125	-.125	-.125	-.125
	CNU	.136	-.125	-.125	-.125	-.125	-.125
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	ODU	.000	.120	.120	.	.120	.120
	NSU	.005	.120	.120	.120	.	.120
	UMW	.066	.120	.120	.120	.120	.
	LU	.218	.120	.120	.120	.120	.120
	GMU	.091	.120	.120	.120	.120	.120
	CNU	.101	.120	.120	.120	.120	.120
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	RU	90	90	90	90	90	90
	ODU	90	90	90	90	90	90
	NSU	90	90	90	90	90	90
	UMW	90	90	90	90	90	90
	LU	90	90	90	90	90	90
	GMU	90	90	90	90	90	90
	CNU	90	90	90	90	90	90

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CNU, GMU, LU, VMI, UMW, NSU, ODU, RU[b]	.	Enter

a. Dependent Variable: PercentageofAuxRevtoAuxExpenditures

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.800[a]	.639	.604	14.34335%

a. Predictors: (Constant), CNU, GMU, LU, VMI, UMW, NSU, ODU, RU

b. Dependent Variable: PercentageofAuxRevtoAuxExpenditures

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29558.787	8	3694.848	17.960	.000[b]
	Residual	16664.276	81	205.732		
	Total	46223.063	89			

a. Dependent Variable: PercentageofAuxRevtoAuxExpenditures

b. Predictors: (Constant), CNU, GMU, LU, VMI, UMW, NSU, ODU, RU

Coefficients[a]

	Unstandardized Coefficients		Standardized Coefficients			Correlations		
Model	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part
(Constant)	27.009	4.536		5.955	.000			
VMI	-45.156	6.415	-.626	-7.040	.000	-.654	-.616	-.470
RU	-8.109	6.415	-.112	-1.264	.210	-.076	-.139	-.084
ODU	20.620	6.415	.286	3.215	.002	.372	.336	.214
NSU	14.179	6.415	.197	2.210	.030	.272	.239	.147
UMW	-13.494	6.415	-.187	-2.104	.039	-.160	-.228	-.140

LU	-8.564	6.415	-.119	-1.335	.186	-.083	-.147	-.089
GMU	5.871	6.415	.081	.915	.363	.142	.101	.061
CNU	5.450	6.415	.076	.850	.398	.136	.094	.057

Collinearity Diagnostics[a]

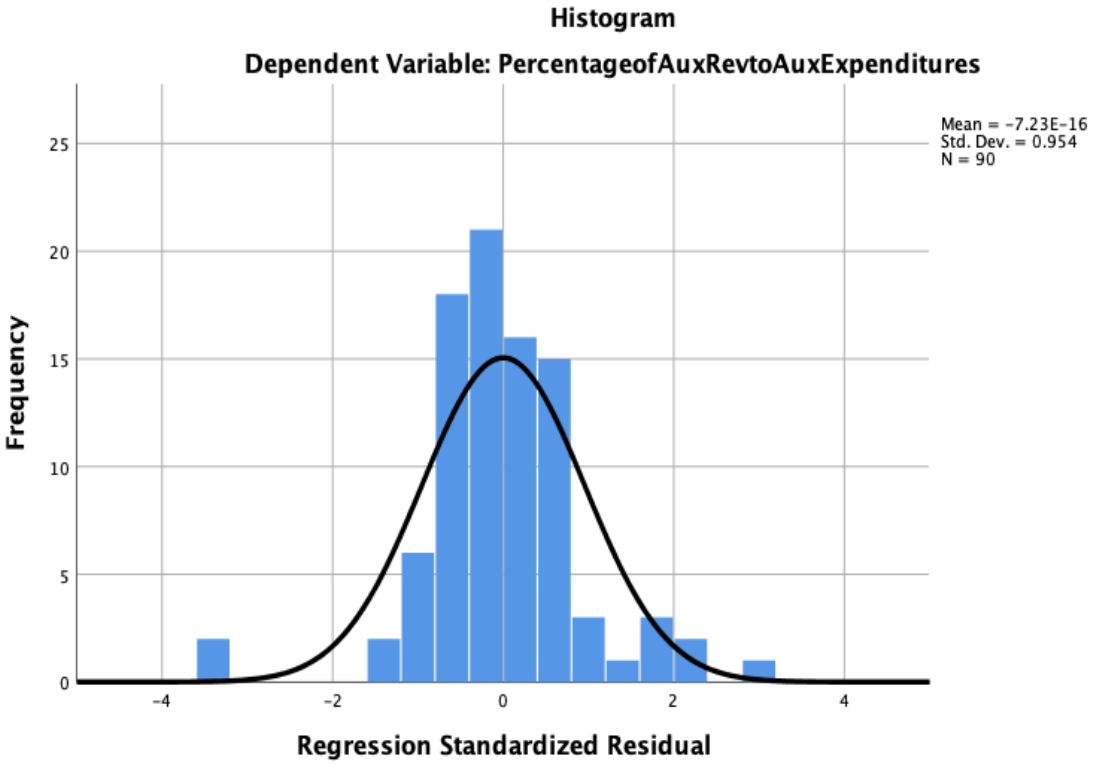
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	VMI	RU	ODU	NSU	UMW
1	1	1.943	1.000	.03	.02	.02	.02	.02	.02
	2	1.000	1.394	.00	.04	.03	.02	.02	.23
	3	1.000	1.394	.00	.01	.01	.00	.00	.05
	4	1.000	1.394	.00	.00	.00	.01	.01	.03
	5	1.000	1.394	.00	.10	.02	.28	.00	.01
	6	1.000	1.394	.00	.01	.15	.06	.20	.02
	7	1.000	1.394	.00	.04	.16	.07	.13	.08
	8	1.000	1.394	.00	.24	.07	.01	.07	.02
	9	.057	5.828	.97	.55	.55	.55	.55	.55

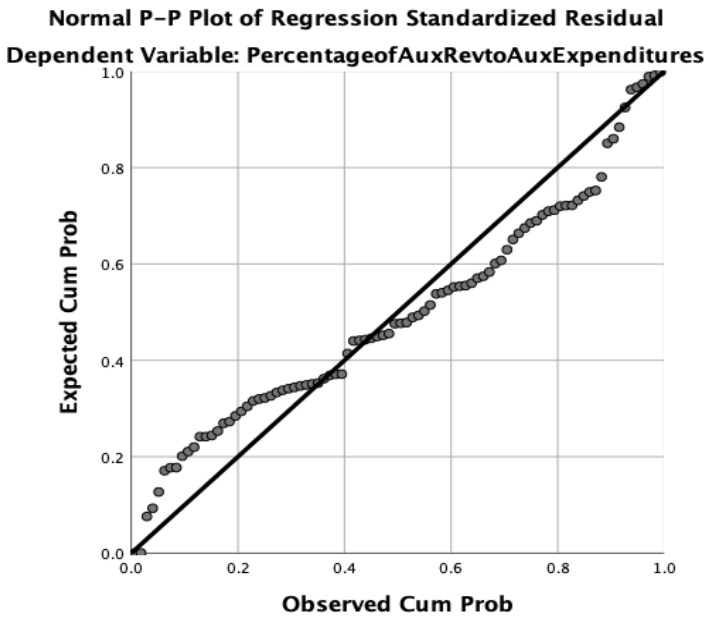
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-18.1463%	47.6297%	23.7646%	18.22419%	90
Residual	-51.11350%	43.07144%	0.00000%	13.68353%	90
Std. Predicted Value	-2.300	1.310	.000	1.000	90
Std. Residual	-3.564	3.003	.000	.954	90

a. Dependent Variable: PercentageofAuxRevtoAuxExpenditures

Charts

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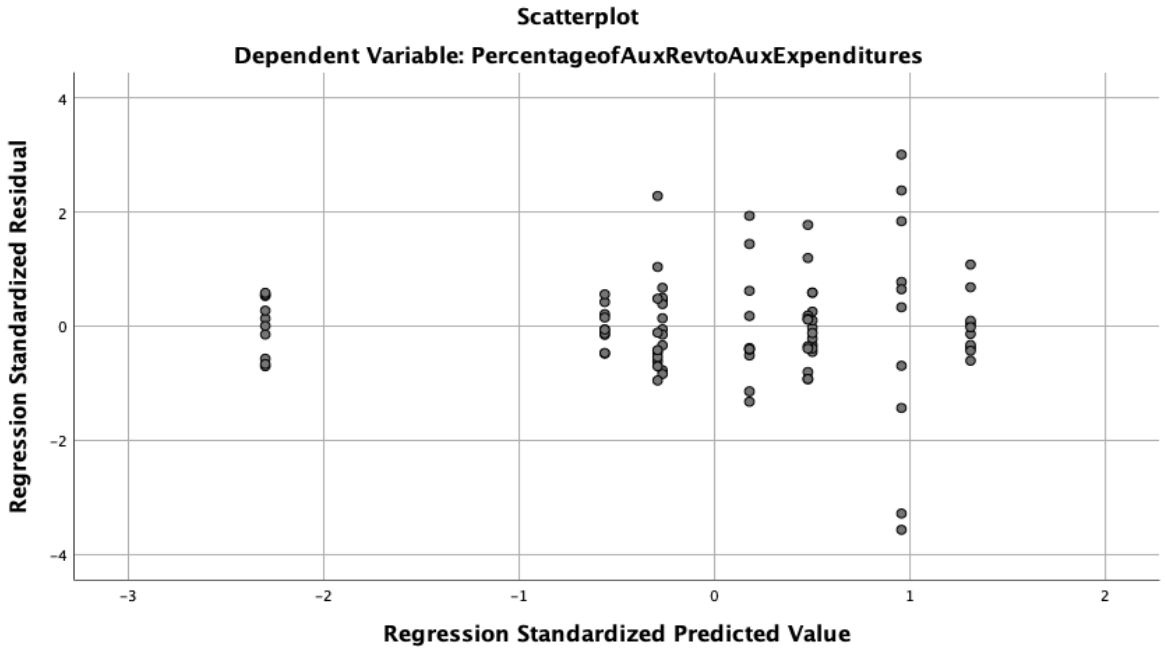
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UMW	.1111	.31603	90
LU	.1111	.31603	90
GMU	.1111	.31603	90
CNU	.1111	.31603	90

Correlations

		Percent Minority	VMI	RU	ODU	NSU	UMW	LU
Pearson Correlation	Percent Minority	1.000	-.221	-.234	.055	.927	-.196	-.238
	VMI	-.221	1.000	-.125	-.125	-.125	-.125	-.125
	RU	-.234	-.125	1.000	-.125	-.125	-.125	-.125
	ODU	.055	-.125	-.125	1.000	-.125	-.125	-.125

	NSU	.927	-.125	-.125	-.125	1.000	-.125	-.125
	UMW	-.196	-.125	-.125	-.125	-.125	1.000	-.125
	LU	-.238	-.125	-.125	-.125	-.125	-.125	1.000
	GMU	.028	-.125	-.125	-.125	-.125	-.125	-.125
	CNU	-.186	-.125	-.125	-.125	-.125	-.125	-.125
Sig. (1-tailed)	Percent Minority	.	.018	.013	.304	.000	.032	.012
	VMI	.018	.	.120	.120	.120	.120	.120
	RU	.013	.120	.	.120	.120	.120	.120
	ODU	.304	.120	.120	.	.120	.120	.120
	NSU	.000	.120	.120	.120	.	.120	.120
	UMW	.032	.120	.120	.120	.120	.	.120
	LU	.012	.120	.120	.120	.120	.120	.
	GMU	.396	.120	.120	.120	.120	.120	.120
	CNU	.040	.120	.120	.120	.120	.120	.120
N	Percent Minority	90	90	90	90	90	90	90
	VMI	90	90	90	90	90	90	90
	RU	90	90	90	90	90	90	90
	ODU	90	90	90	90	90	90	90
	NSU	90	90	90	90	90	90	90
	UMW	90	90	90	90	90	90	90
	LU	90	90	90	90	90	90	90
	GMU	90	90	90	90	90	90	90
	CNU	90	90	90	90	90	90	90

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CNU, GMU, LU, VMI, UMW, NSU, ODU, RU[b]	.	Enter

a. Dependent Variable: Percent Minority

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.989[a]	.978	.975	3.65306%

a. Predictors: (Constant), CNU, GMU, LU, VMI, UMW, NSU, ODU, RU

b. Dependent Variable: Percent Minority

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	47159.070	8	5894.884	441.735	.000[b]
	Residual	1080.931	81	13.345		
	Total	48240.001	89			

a. Dependent Variable: Percent Minority

b. Predictors: (Constant), CNU, GMU, LU, VMI, UMW, NSU, ODU, RU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations		
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part
1	(Constant)	33.254	1.155		28.787	.000			
	VMI	-18.713	1.634	-.254	-11.454	.000	-.221	-.786	-.191
	RU	-19.589	1.634	-.266	-11.991	.000	-.234	-.800	-.199
	ODU	-.668	1.634	-.009	-.409	.684	.055	-.045	-.007
	NSU	56.412	1.634	.766	34.530	.000	.927	.968	.574
	UMW	-17.100	1.634	-.232	-10.467	.000	-.196	-.758	-.174
	LU	-19.848	1.634	-.269	-12.149	.000	-.238	-.804	-.202
	GMU	-2.409	1.634	-.033	-1.474	.144	.028	-.162	-.025
	CNU	-16.451	1.634	-.223	-10.070	.000	-.186	-.746	-.167

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	VMI	RU	ODU	NSU	UMW
1	1	1.943	1.000	.03	.02	.02	.02	.02	.02
	2	1.000	1.394	.00	.04	.03	.02	.02	.23

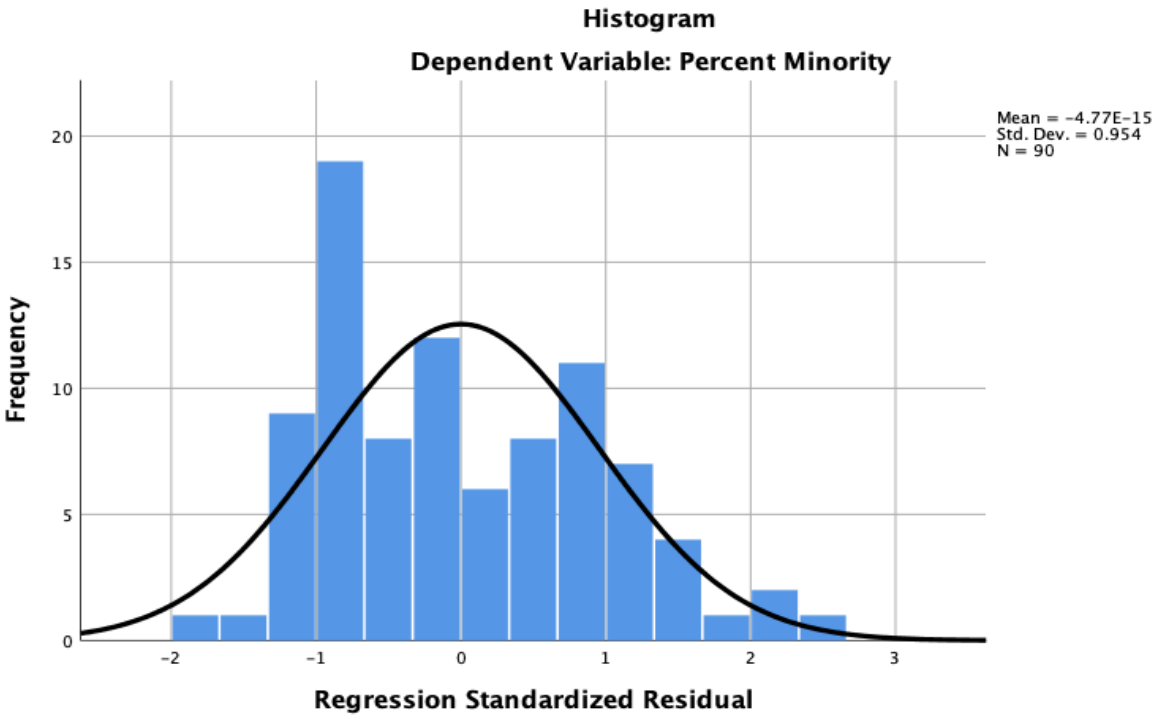
	3	1.000	1.394	.00	.01	.01	.00	.00	.05
	4	1.000	1.394	.00	.00	.00	.01	.01	.03
	5	1.000	1.394	.00	.10	.02	.28	.00	.01
	6	1.000	1.394	.00	.01	.15	.06	.20	.02
	7	1.000	1.394	.00	.04	.16	.07	.13	.08
	8	1.000	1.394	.00	.24	.07	.01	.07	.02
	9	.057	5.828	.97	.55	.55	.55	.55	.55

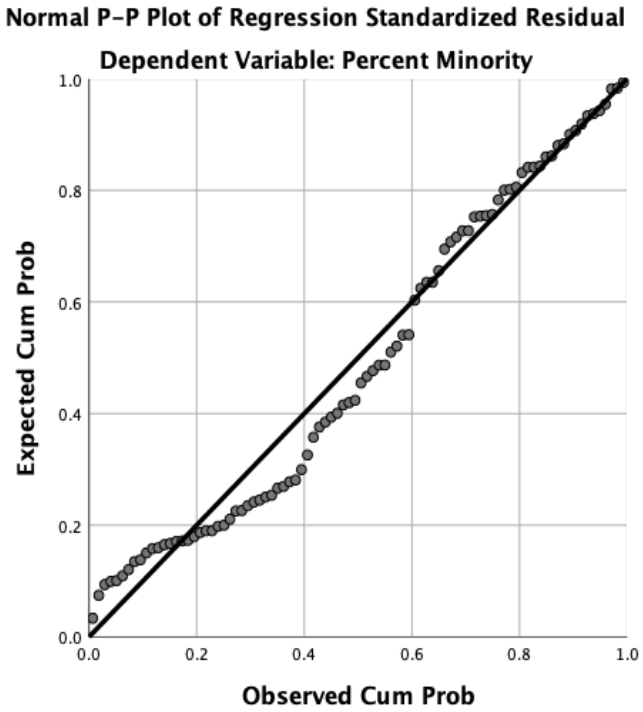
Residuals Statistics[a]

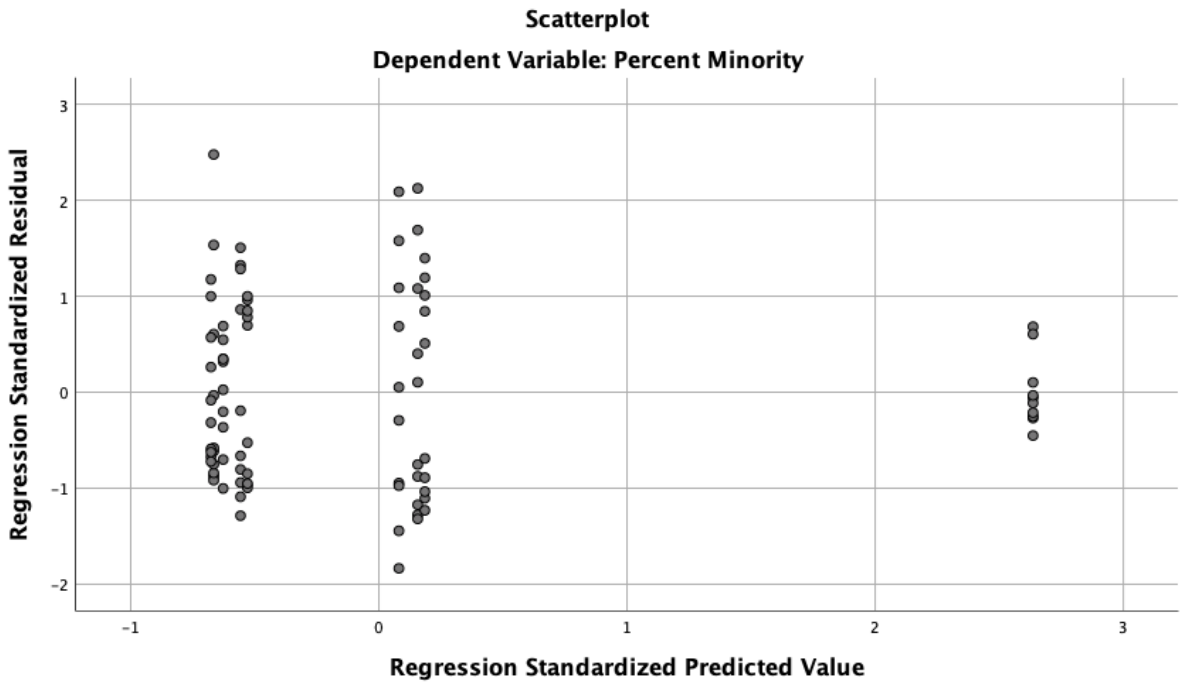
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	13.4067%	89.6664%	28.9915%	23.01906%	90
Residual	-6.70218%	9.04370%	0.00000%	3.48501%	90
Std. Predicted Value	-.677	2.636	.000	1.000	90
Std. Residual	-1.835	2.476	.000	.954	90

a. Dependent Variable: Percent Minority

Charts


Histogram
Dependent Variable: Percent Minority
Mean = -4.77E-15
Std. Dev. = 0.954
N = 90
Frequency
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Percent Minority
Expected Cum Prob
Observed Cum Prob




```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PercentAdmins.Staff
  /METHOD=ENTER VMI RU ODU NSU UMW LU GMU CNU
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

Regression

Notes

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Comments		
Input	Data	/Users/glruther/Box Sync/Ph.D. Coursework/Dissertation/IPEDS Data/Delta_database_87_2015_SPSS/For Dissertation/Dissertation SPSS with percenages and no Virg. State 8.24.21.sav
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	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	90
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA COLLIN TOL ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT PercentAdmins.Staff /METHOD=ENTER VMI RU ODU NSU UMW LU GMU CNU /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
Resources	Processor Time	00:00:00.40
	Elapsed Time	00:00:00.00
	Memory Required	8272 bytes
	Additional Memory Required for Residual Plots	784 bytes

Descriptive Statistics

	Mean	Std. Deviation	N
Percent Admins. Staff	6.6322%	6.88478%	90
VMI	.1111	.31603	90

RU	.1111	.31603	90
ODU	.1111	.31603	90
NSU	.1111	.31603	90
UMW	.1111	.31603	90
LU	.1111	.31603	90
GMU	.1111	.31603	90
CNU	.1111	.31603	90

Correlations

		Percent Admins. Staff	VMI	RU	ODU	NSU	UMW
Pearson Correlation	Percent Admins. Staff	1.000	.284	-.172	-.097	.195	-.023
	VMI	.284	1.000	-.125	-.125	-.125	-.125
	RU	-.172	-.125	1.000	-.125	-.125	-.125
	ODU	-.097	-.125	-.125	1.000	-.125	-.125
	NSU	.195	-.125	-.125	-.125	1.000	-.125
	UMW	-.023	-.125	-.125	-.125	-.125	1.000
	LU	.077	-.125	-.125	-.125	-.125	-.125
	GMU	.020	-.125	-.125	-.125	-.125	-.125
	CNU	-.227	-.125	-.125	-.125	-.125	-.125
Sig. (1-tailed)	Percent Admins. Staff	.	.003	.052	.181	.033	.413
	VMI	.003	.	.120	.120	.120	.120

	RU	.052	.120	.	.120	.120	.120
	ODU	.181	.120	.120	.	.120	.120
	NSU	.033	.120	.120	.120	.	.120
	UMW	.413	.120	.120	.120	.120	.
	LU	.235	.120	.120	.120	.120	.120
	GMU	.426	.120	.120	.120	.120	.120
	CNU	.016	.120	.120	.120	.120	.120
N	Percent Admins. Staff	90	90	90	90	90	90
	VMI	90	90	90	90	90	90
	RU	90	90	90	90	90	90
	ODU	90	90	90	90	90	90
	NSU	90	90	90	90	90	90
	UMW	90	90	90	90	90	90
	LU	90	90	90	90	90	90
	GMU	90	90	90	90	90	90
	CNU	90	90	90	90	90	90

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CNU, GMU, LU, VMI, UMW, NSU, ODU, RU[b]	.	Enter

a. Dependent Variable: Percent Admins. Staff

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.441[a]	.195	.115	6.47570%

a. Predictors: (Constant), CNU, GMU, LU, VMI, UMW, NSU, ODU, RU

b. Dependent Variable: Percent Admins. Staff

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	821.915	8	102.739	2.450	.020[b]
	Residual	3396.705	81	41.935		
	Total	4218.620	89			

a. Dependent Variable: Percent Admins. Staff

b. Predictors: (Constant), CNU, GMU, LU, VMI, UMW, NSU, ODU, RU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations		
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part
1	(Constant)	5.546	2.048		2.708	.008			
	VMI	6.588	2.896	.302	2.275	.026	.284	.245	.227
	RU	-2.247	2.896	-.103	-.776	.440	-.172	-.086	-.077
	ODU	-.798	2.896	-.037	-.276	.784	-.097	-.031	-.027
	NSU	4.854	2.896	.223	1.676	.098	.195	.183	.167
	UMW	.632	2.896	.029	.218	.828	-.023	.024	.022
	LU	2.583	2.896	.119	.892	.375	.077	.099	.089
	GMU	1.473	2.896	.068	.509	.612	.020	.056	.051
	CNU	-3.305	2.896	-.152	-1.141	.257	-.227	-.126	-.114

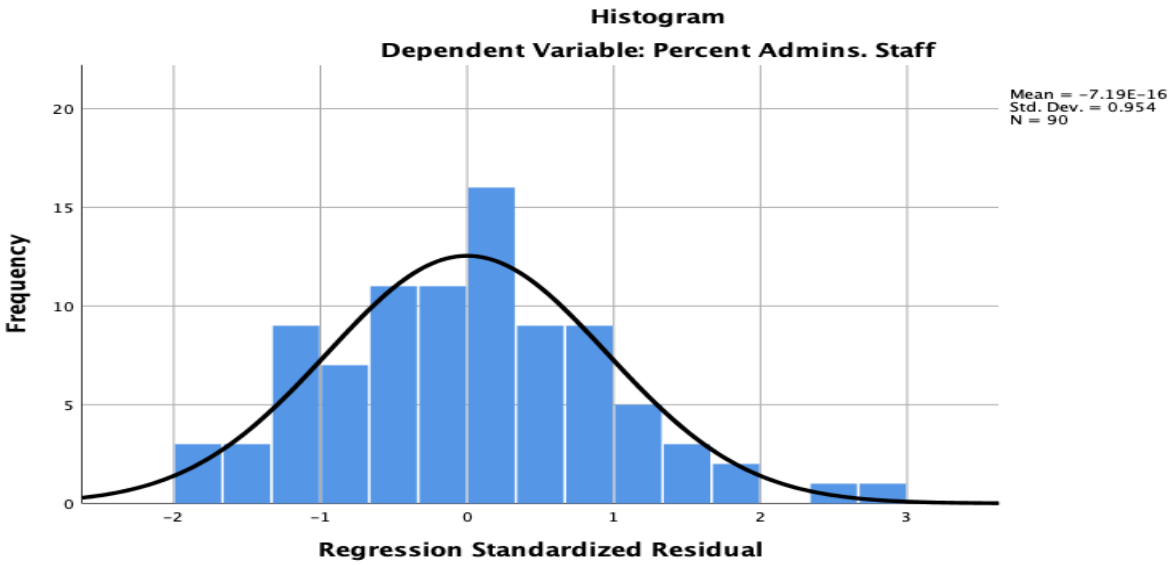
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	VMI	RU	ODU	NSU	UMW
1	1	1.943	1.000	.03	.02	.02	.02	.02	.02
	2	1.000	1.394	.00	.04	.03	.02	.02	.23
	3	1.000	1.394	.00	.01	.01	.00	.00	.05
	4	1.000	1.394	.00	.00	.00	.01	.01	.03
	5	1.000	1.394	.00	.10	.02	.28	.00	.01
	6	1.000	1.394	.00	.01	.15	.06	.20	.02
	7	1.000	1.394	.00	.04	.16	.07	.13	.08
	8	1.000	1.394	.00	.24	.07	.01	.07	.02
	9	.057	5.828	.97	.55	.55	.55	.55	.55

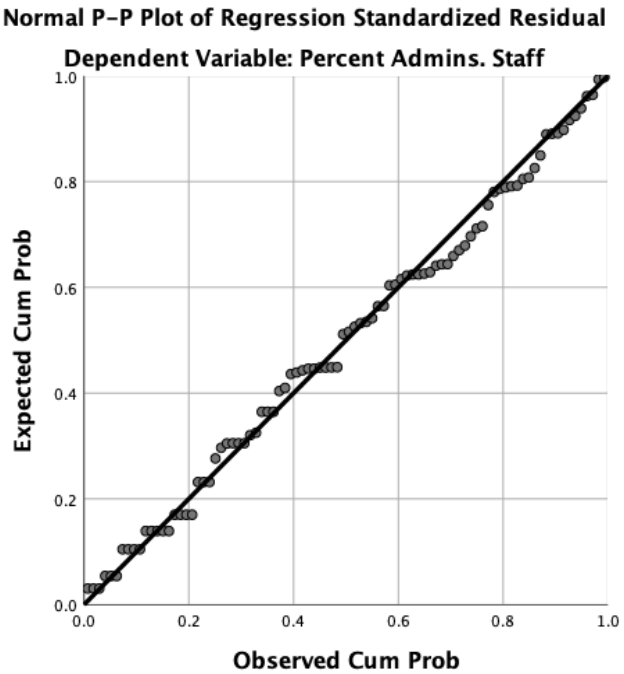
Residuals Statistics[a]

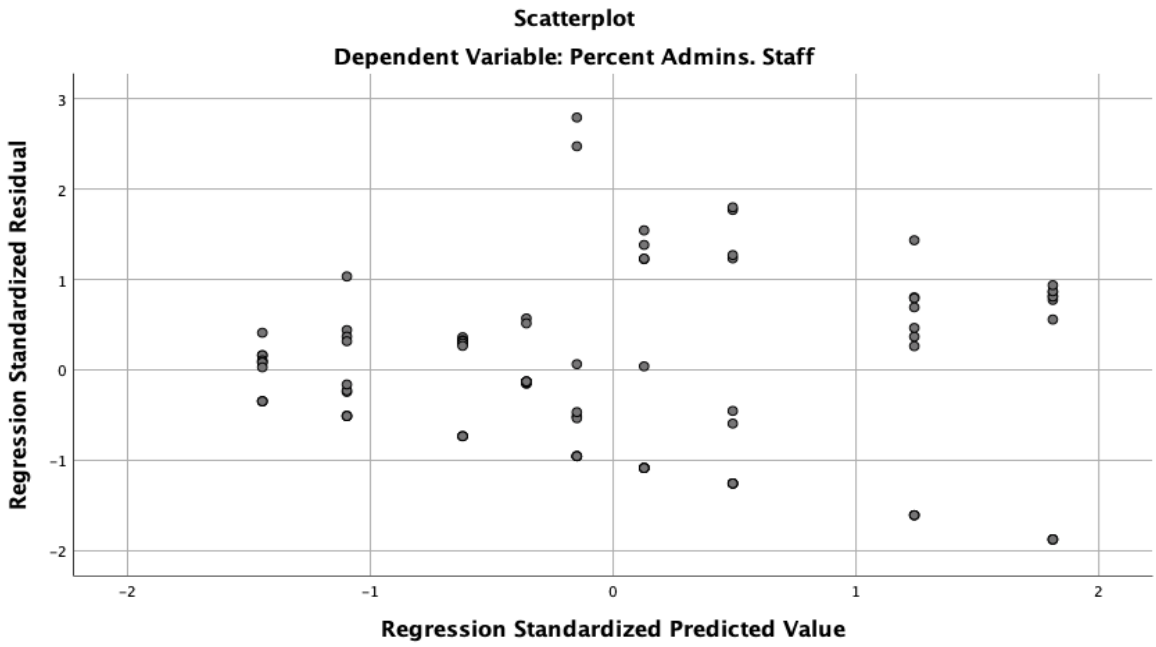
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.2406%	12.1339%	6.6322%	3.03891%	90
Residual	-12.13391%	18.06982%	0.00000%	6.17780%	90
Std. Predicted Value	-1.445	1.810	.000	1.000	90
Std. Residual	-1.874	2.790	.000	.954	90

a. Dependent Variable: Percent Admins. Staff

Charts


Histogram
Dependent Variable: Percent Admins. Staff
Mean = -7.19E-16
Std. Dev. = 0.954
N = 90
Frequency
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Percent Admins. Staff
Expected Cum Prob
Observed Cum Prob



DESCRIPTIVES VARIABLES=PreAux PostAux PreEnroll PostEnroll PreAdmin Postadmin

/STATISTICS=MEAN STDDEV MIN MAX.

Descriptives

Notes

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Comments	

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	Active Dataset	DataSet1
	Filter	<none>
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	Split File	<none>
	N of Rows in Working Data File	7
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=PreAux PostAux PreEnroll PostEnroll PreAdmin Postadmin /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.00

	Elapsed Time	00:00:00.00

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
PreAux	3	21.52%	47.65%	35.0167%	13.08638%
PostAux	7	8.05%	54.73%	23.5786%	15.49892%
PreEnroll	3	28.76%	29.47%	29.1500%	0.36014%
Post Enroll	7	30.00%	38.36%	35.0114%	3.33862%
PreAdmin	3	4.55%	9.23%	7.5533%	2.60684%
Postadmin	7	4.62%	4.72%	4.6857%	0.03505%
Valid N (listwise)	3				

PPLOT

/VARIABLES=PreAux PostAux PreEnroll PostEnroll PreAdmin Postadmin

/NOLOG

/NOSTANDARDIZE

/TYPE=P-P

/FRACTION=BLOM

/TIES=MEAN

/DIST=NORMAL.

PPlot

Notes

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	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	7
	Date	<none>

Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	For a given sequence or time series variable, cases with missing values are not used in the analysis. Cases with negative or zero values are also not used, if the log transform is requested.
Syntax		PPLOT /VARIABLES=PreAux PostAux PreEnroll PostEnroll PreAdmin Postadmin /NOLOG /NOSTANDARDIZE /TYPE=P-P /FRACTION=BLOM /TIES=MEAN /DIST=NORMAL.
Resources	Processor Time	00:00:01.62
	Elapsed Time	00:00:02.00
Use	From	First observation
	To	Last observation

Time Series Settings (TSET)	Amount of Output	PRINT = DEFAULT
	Saving New Variables	NEWVAR = CURRENT
	Maximum Number of Lags in Autocorrelation or Partial Autocorrelation Plots	MXAUTO = 16
	Maximum Number of Lags Per Cross-Correlation Plots	MXCROSS = 7
	Maximum Number of New Variables Generated Per Procedure	MXNEWVAR = 60
	Maximum Number of New Cases Per Procedure	MXPREDICT = 1000
	Treatment of User-Missing Values	MISSING = EXCLUDE
	Confidence Interval Percentage Value	CIN = 95
	Tolerance for Entering Variables in Regression Equations	TOLER = .0001
	Maximum Iterative Parameter Change	CNVERGE = .001
	Method of Calculating Std. Errors for Autocorrelations	ACFSE = IND

	Length of Seasonal Period	Unspecified
	Variable Whose Values Label Observations in Plots	Unspecified
	Equations Include	CONSTANT

Model Description

Model Name		MOD_3
Series or Sequence	1	PreAux
	2	PostAux
	3	PreEnroll
	4	Post Enroll
	5	PreAdmin
	6	Postadmin
Transformation		None
Non-Seasonal Differencing		0
Seasonal Differencing		0
Length of Seasonal Period		No periodicity
Standardization		Not applied
Distribution	Type	Normal
	Location	estimated
	Scale	estimated

Fractional Rank Estimation Method	Blom's
Rank Assigned to Ties	Mean rank of tied values

Applying the model specifications from MOD_3

Case Processing Summary

		PreAux	PostAux	PreEnroll	Post Enroll	PreAdmin	Postadmin
Series or Sequence Length		7	7	7	7	7	7
Number of Missing Values in the Plot	User-Missing	0	0	0	0	0	0
	System-Missing	4	0	4	0	4	0

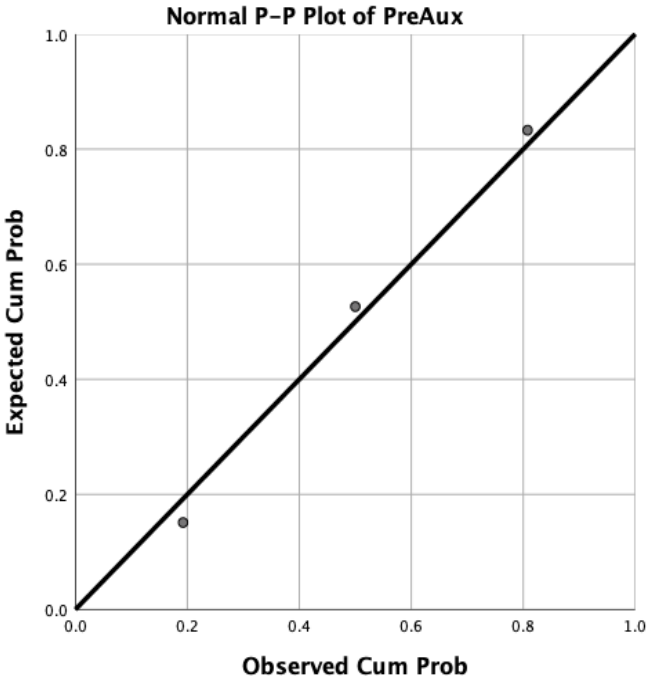
The cases are unweighted.

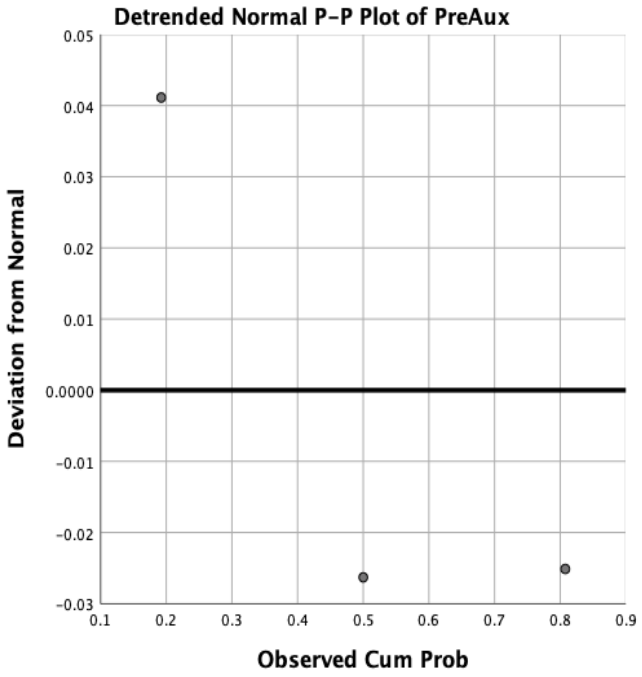
Estimated Distribution Parameters

		PreAux	PostAux	PreEnroll	Post Enroll	PreAdmin	Postadmin
Normal Distribution	Location	35.0167%	23.5786%	29.1500%	35.0114%	7.5533%	4.6857%
	Scale	13.08638%	15.49892%	0.36014%	3.33862%	2.60684%	0.03505%

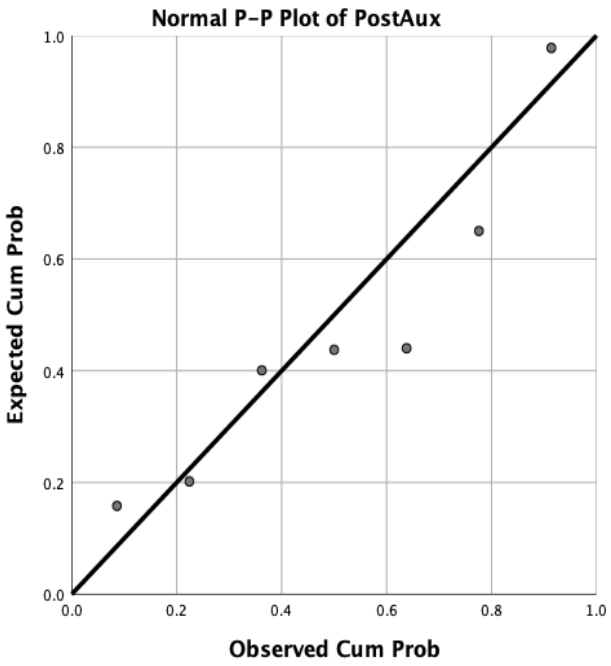
The cases are unweighted.

PreAux




Detrended Normal P-P Plot of PreAux
Deviation from Normal
0.05
0.04
0.03
0.02
0.01
0.0000
-0.01
-0.02
-0.03
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Observed Cum Prob

PostAux


Normal P-P Plot of PostAux
Expected Cum Prob
Observed Cum Prob
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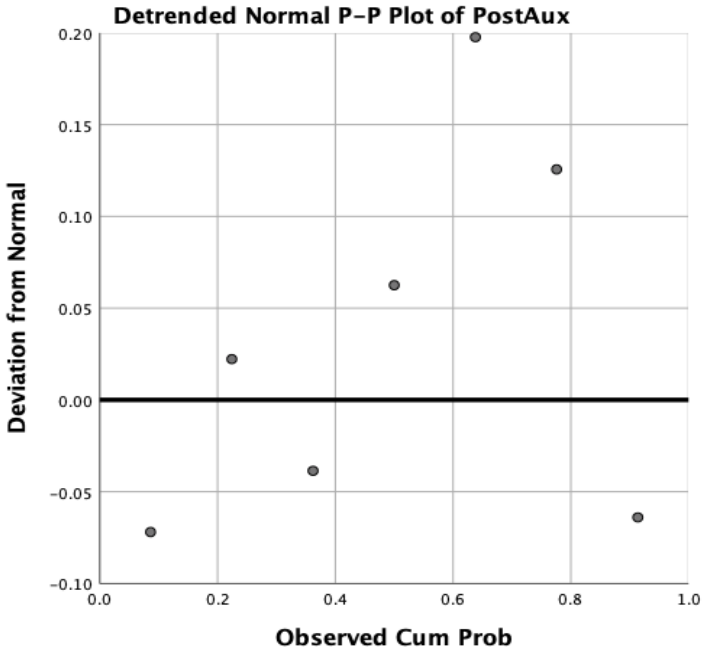
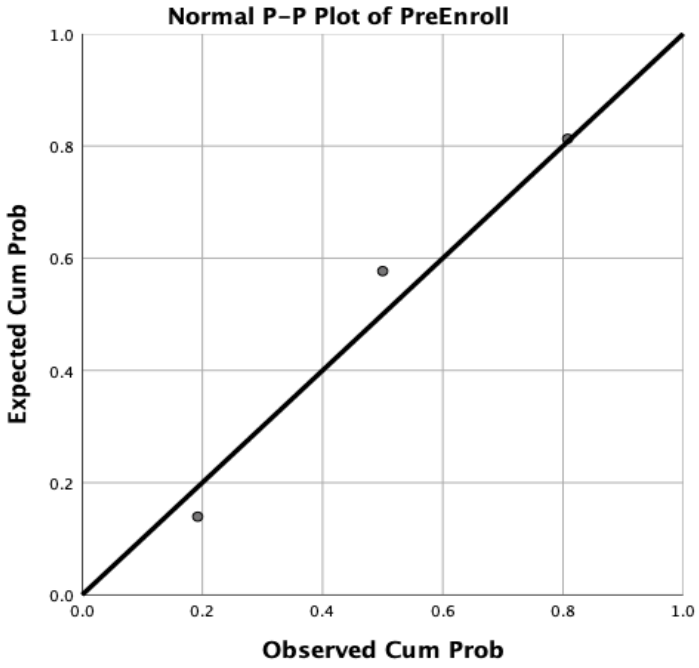
0.2
0.4
0.6
0.8
1.0


Detrended Normal P-P Plot of PostAux
Deviation from Normal
Observed Cum Prob
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
0.0
0.2
0.4
0.6
0.8
1.0

PreEnroll


Normal P-P Plot of PreEnroll
Expected Cum Prob
Observed Cum Prob
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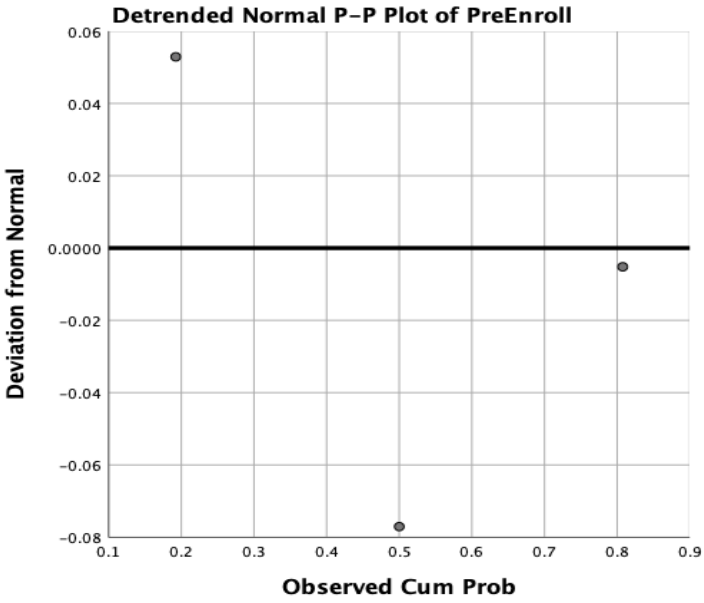
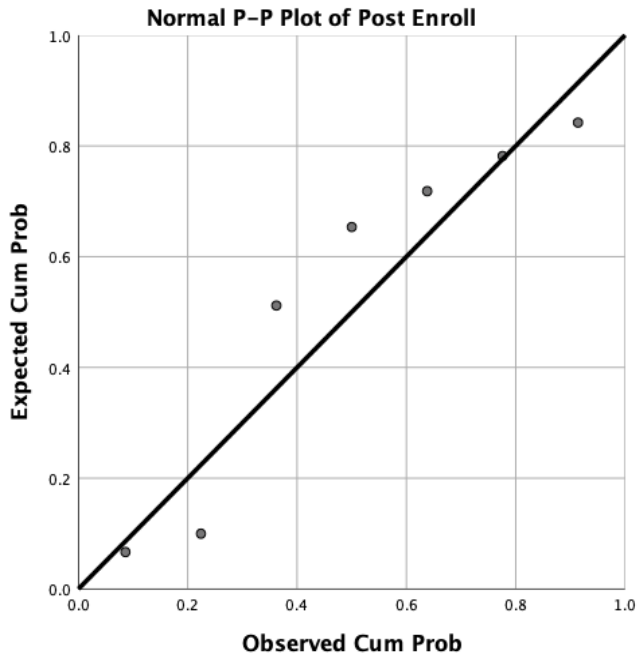
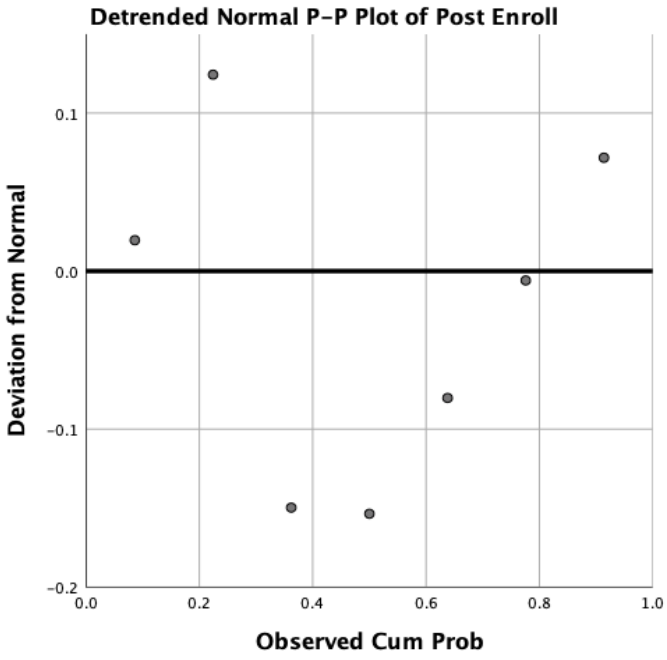
0.4
0.6
0.8
1.0


Detrended Normal P-P Plot of PreEnroll
Deviation from Normal
0.06
0.04
0.02
0.0000
-0.02
-0.04
-0.06
-0.08
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Observed Cum Prob

Post Enroll


Normal P-P Plot of Post Enroll
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Detrended Normal P-P Plot of Post Enroll
Deviation from Normal
Observed Cum Prob
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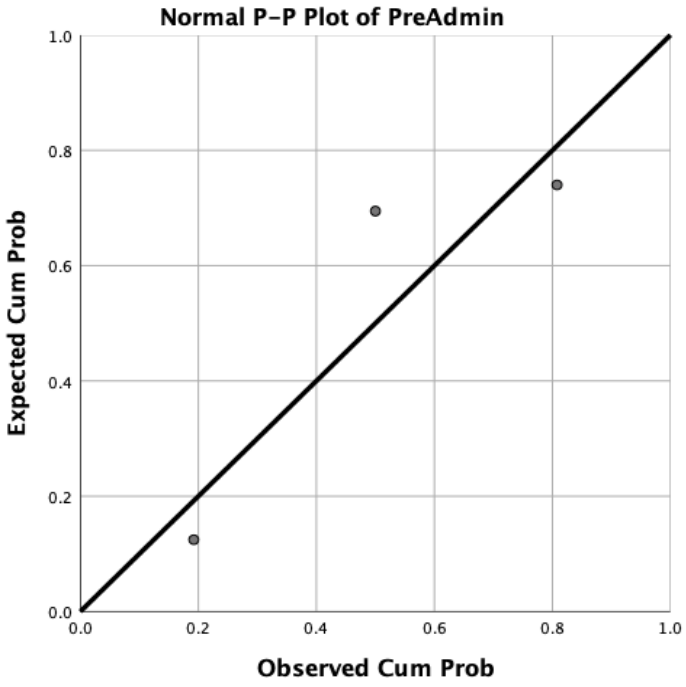
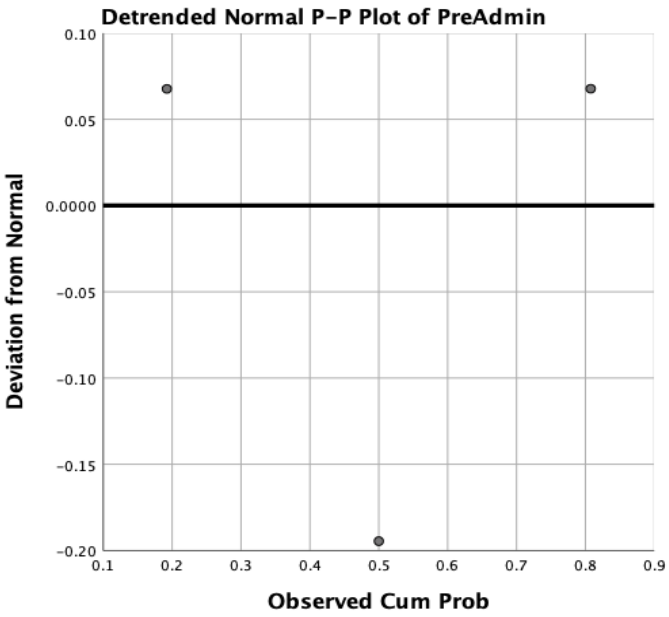
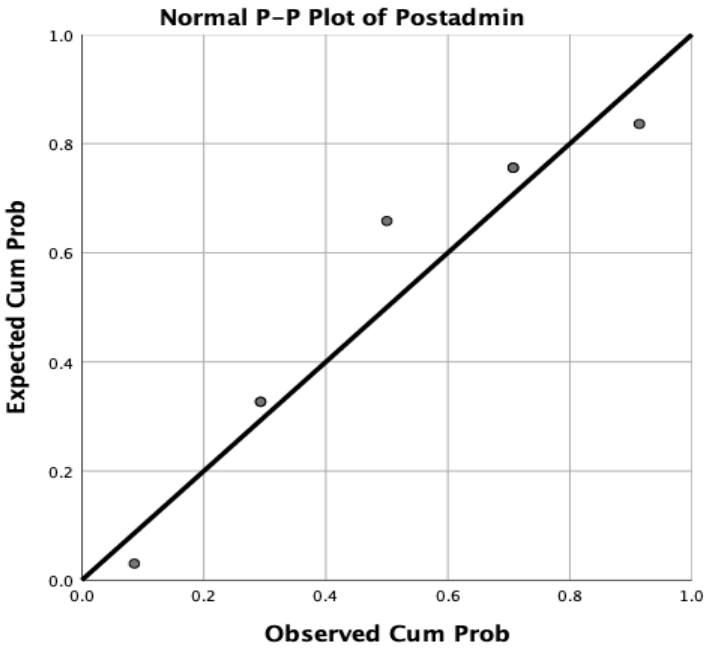
0.0
-0.1
-0.2
0.0
0.2
0.4
0.6
0.8
1.0

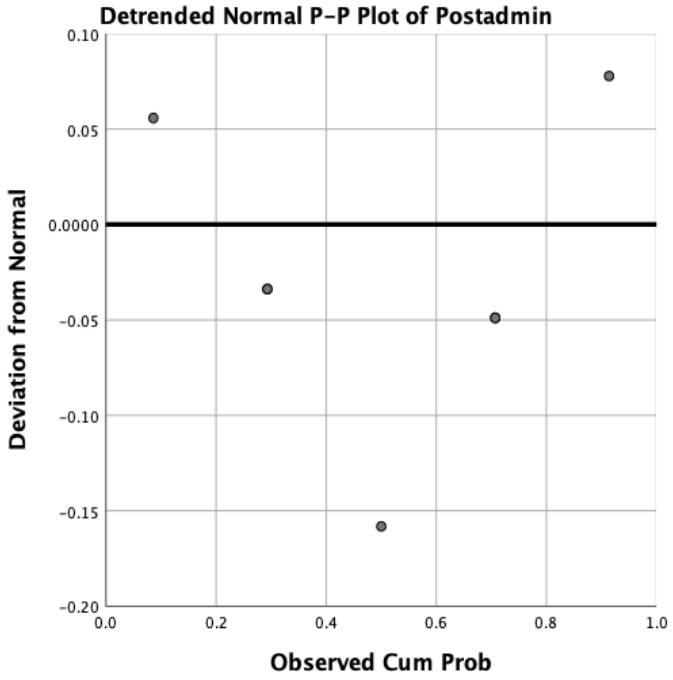
PreAdmin


Normal P-P Plot of PreAdmin
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Detrended Normal P-P Plot of PreAdmin
Deviation from Normal
Observed Cum Prob
0.10
0.05
0.0000
-0.05
-0.10
-0.15
-0.20
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9

Postadmin


Normal P-P Plot of Postadmin
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Detrended Normal P-P Plot of Postadmin
Deviation from Normal
Observed Cum Prob
0.10
0.05
0.0000
-0.05
-0.10
-0.15
-0.20
0.0
0.2
0.4
0.6
0.8
1.0

Notes

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Comments		
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	Filter	<none>
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	Split File	<none>
	N of Rows in Working Data File	7
	Date	<none>
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.

	Cases Used	For a given sequence or time series variable, cases with missing values are not used in the analysis. Cases with negative or zero values are also not used, if the log transform is requested.
Syntax		PPLOT /VARIABLES=PreAux PostAux PreEnroll PostEnroll PreAdmin Postadmin /NOLOG /NOSTANDARDIZE /TYPE=Q-Q /FRACTION=BLOM /TIES=MEAN /DIST=NORMAL.
Resources	Processor Time	00:00:01.49
	Elapsed Time	00:00:02.00
Use	From	First observation
	To	Last observation
Time Series Settings (TSET)	Amount of Output	PRINT = DEFAULT

	Saving New Variables	NEWVAR = CURRENT
	Maximum Number of Lags in Autocorrelation or Partial Autocorrelation Plots	MXAUTO = 16
	Maximum Number of Lags Per Cross-Correlation Plots	MXCROSS = 7
	Maximum Number of New Variables Generated Per Procedure	MXNEWVAR = 60
	Maximum Number of New Cases Per Procedure	MXPREDICT = 1000
	Treatment of User-Missing Values	MISSING = EXCLUDE
	Confidence Interval Percentage Value	CIN = 95
	Tolerance for Entering Variables in Regression Equations	TOLER = .0001
	Maximum Iterative Parameter Change	CNVERGE = .001
	Method of Calculating Std. Errors for Autocorrelations	ACFSE = IND
	Length of Seasonal Period	Unspecified

	Variable Whose Values Label Observations in Plots	Unspecified
	Equations Include	CONSTANT

PPLOT

/VARIABLES=PreAux PostAux PreEnroll PostEnroll PreAdmin Postadmin

/NOLOG

/NOSTANDARDIZE

/TYPE=Q-Q

/FRACTION=BLOM

/TIES=MEAN

/DIST=NORMAL.

PPlot

Model Description

Model Name	MOD_4

Series or Sequence	1	PreAux
	2	PostAux
	3	PreEnroll
	4	Post Enroll
	5	PreAdmin
	6	Postadmin
Transformation		None
Non-Seasonal Differencing		0
Seasonal Differencing		0
Length of Seasonal Period		No periodicity
Standardization		Not applied
Distribution	Type	Normal
	Location	estimated
	Scale	estimated
Fractional Rank Estimation Method		Blom's
Rank Assigned to Ties		Mean rank of tied values

Applying the model specifications from MOD_4

Case Processing Summary

		Pre-Aux	Post-Aux	Pre-Enroll	Post-Enroll	Pre-Admin	Post-admin
Series or Sequence Length		7	7	7	7	7	7
Number of Missing Values in the Plot	User-Missing	0	0	0	0	0	0
	System-Missing	4	0	4	0	4	0

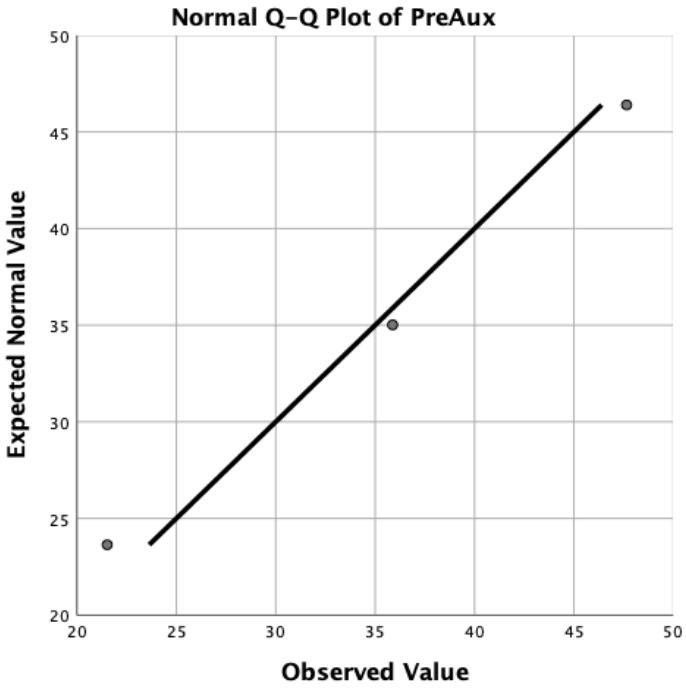
The cases are unweighted.

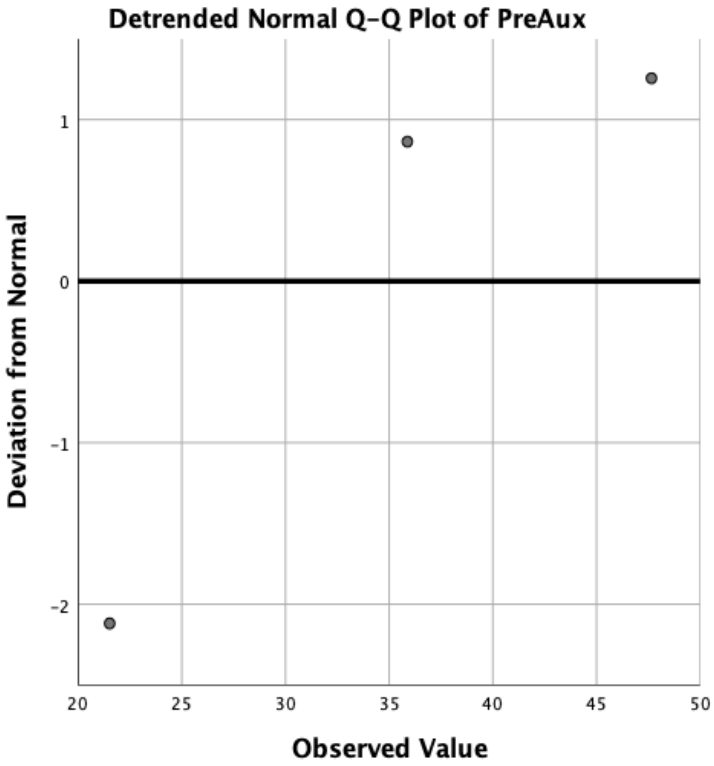
Estimated Distribution Parameters

		Pre-Aux	Post-Aux	Pre-Enroll	Post-Enroll	Pre-Admin	Post-Admin
Normal Distribution	Location	35.0167%	23.5786%	29.1500%	35.0114%	7.5533%	4.6857%
	Scale	13.08638%	15.49892%	0.36014%	3.33862%	2.60684%	0.03505%

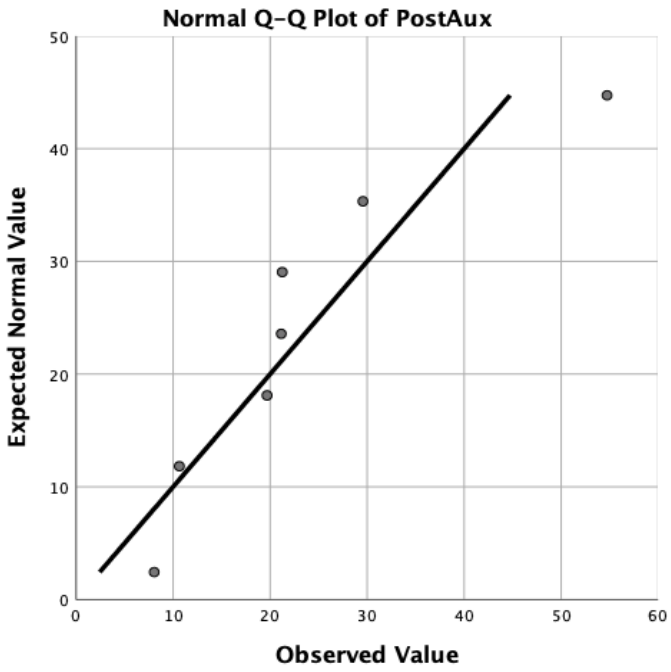
The cases are unweighted.

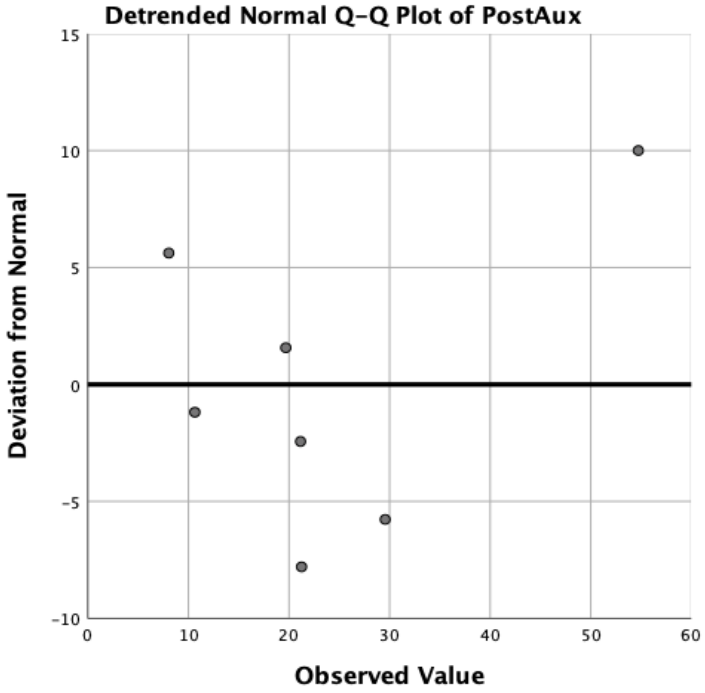
PreAux


Normal Q-Q Plot of PreAux
Expected Normal Value
Observed Value
50
45
40
35
30
25
20
20
25
30
35
40
45
50

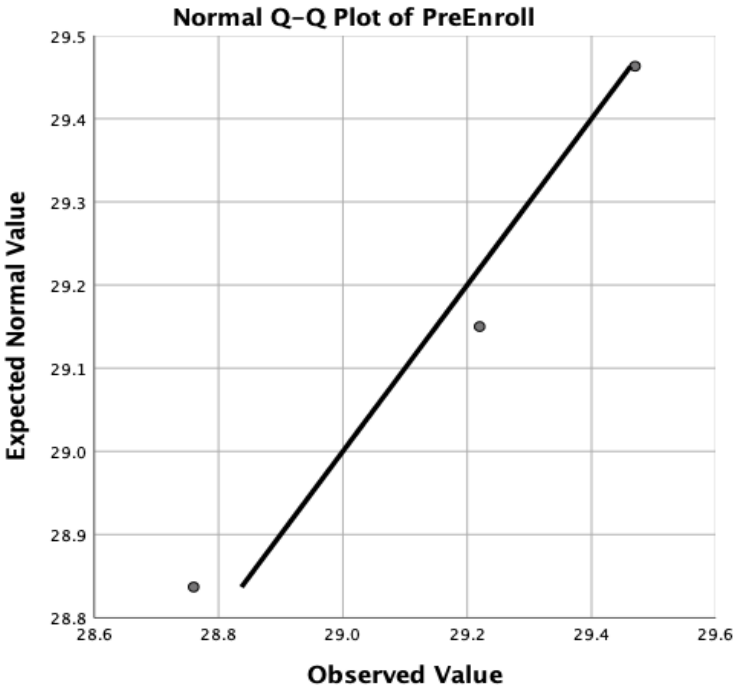

Detrended Normal Q-Q Plot of PreAux
Deviation from Normal
1
0
-1
-2
20
25
30
35
40
45
50
Observed Value

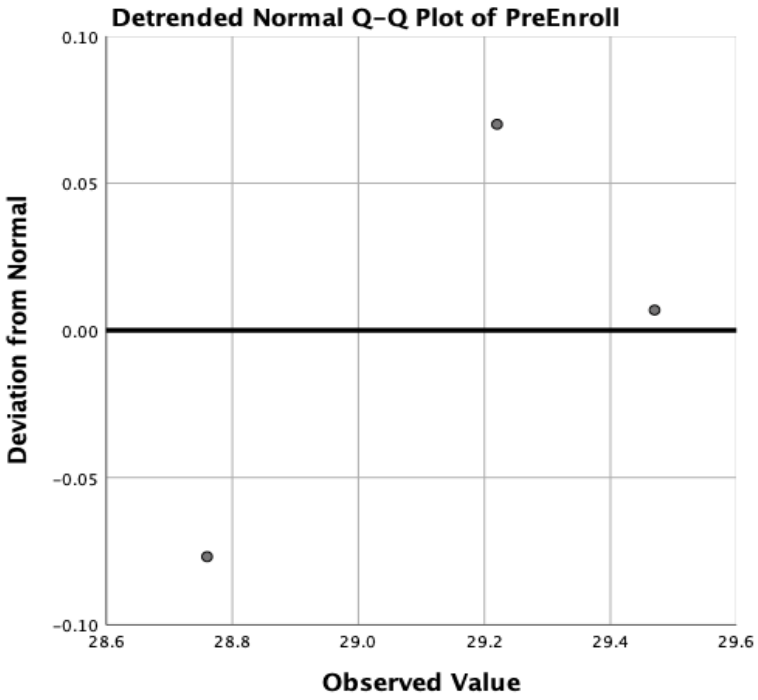
PostAux


Normal Q-Q Plot of PostAux
Expected Normal Value
Observed Value
0
10
20
30
40
50
60

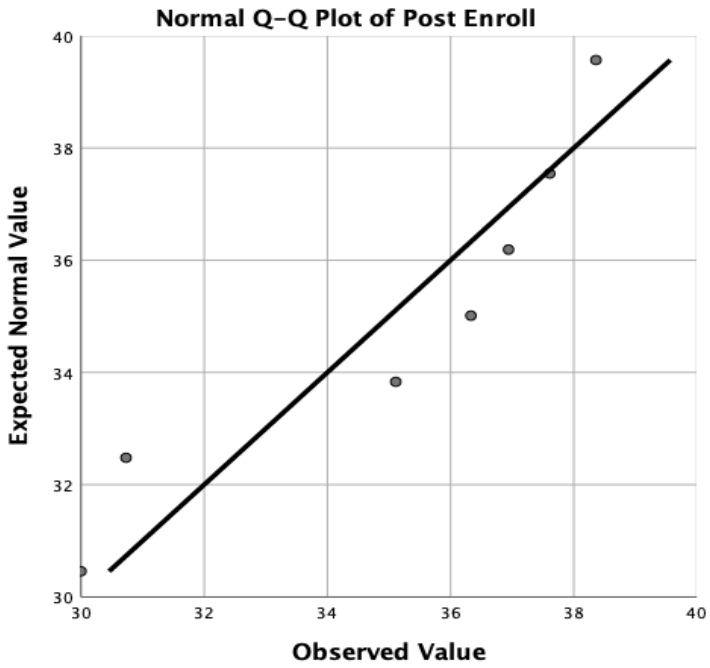

Detrended Normal Q-Q Plot of PostAux
Deviation from Normal
Observed Value
15
10
5
0
-5
-10
0
10
20
30
40
50
60

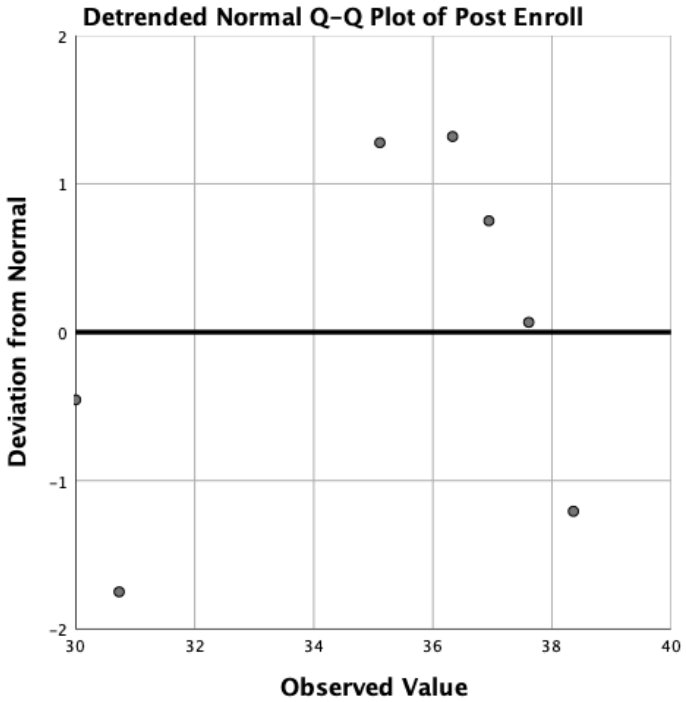
PreEnroll


Normal Q-Q Plot of PreEnroll
Expected Normal Value
29.5
29.4
29.3
29.2
29.1
29.0
28.9
28.8
28.6
28.8
29.0
29.2
29.4
29.6
Observed Value

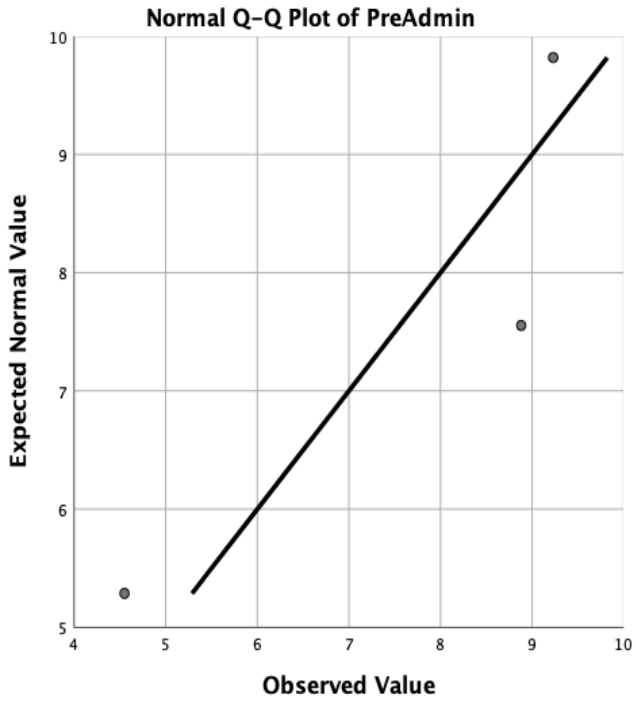

Detrended Normal Q-Q Plot of PreEnroll
Deviation from Normal
0.10
0.05
0.00
-0.05
-0.10
28.6
28.8
29.0
29.2
29.4
29.6
Observed Value

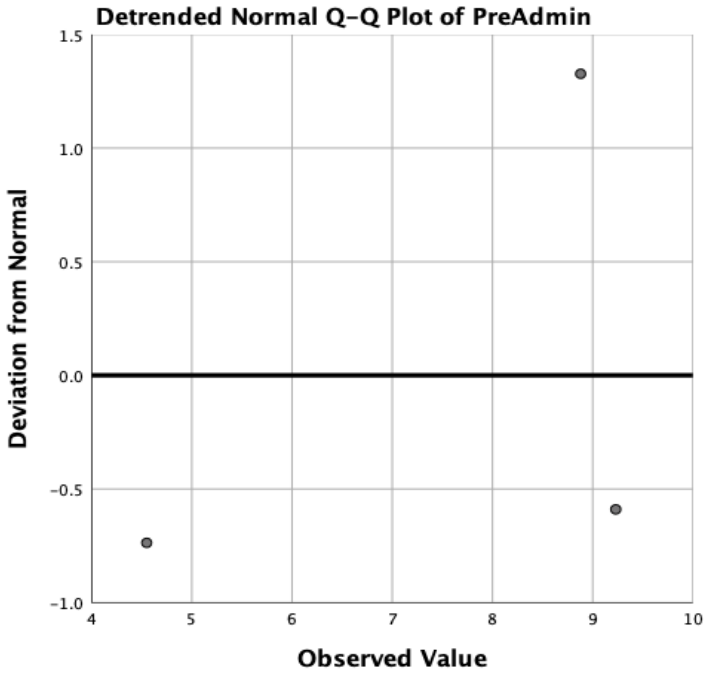
Post Enroll


Normal Q-Q Plot of Post Enroll
Expected Normal Value
Observed Value
40
38
36
34
32
30
30
32
34
36
38
40

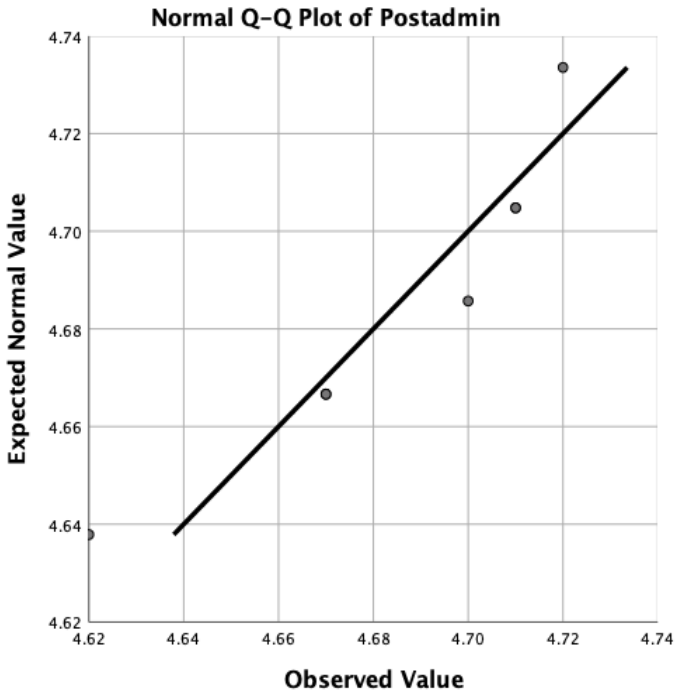

Detrended Normal Q-Q Plot of Post Enroll
Deviation from Normal
Observed Value
2
1
0
-1
-2
30
32
34
36
38
40

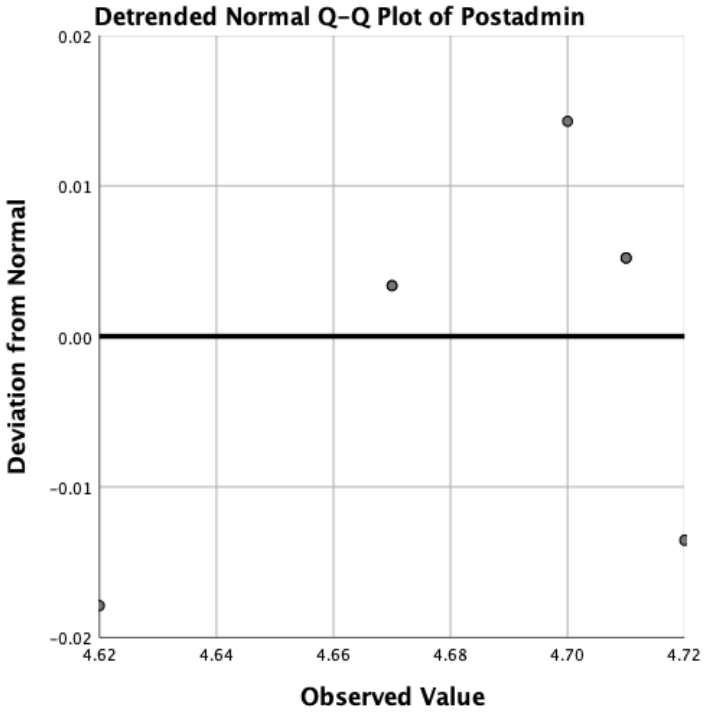
PreAdmin


Normal Q-Q Plot of PreAdmin
Expected Normal Value
Observed Value
10
9
8
7
6
5
4
5
6
7
8
9
10


Detrended Normal Q-Q Plot of PreAdmin
Deviation from Normal
1.5
1.0
0.5
0.0
-0.5
-1.0
4
5
6
7
8
9
10
Observed Value

Postadmin


Normal Q-Q Plot of Postadmin
Expected Normal Value
Observed Value
4.74
4.72
4.70
4.68
4.66
4.64
4.62
4.62
4.64
4.66
4.68
4.70
4.72
4.74


Detrended Normal Q-Q Plot of Postadmin
Deviation from Normal
Observed Value
0.02
0.01
0.00
-0.01
-0.02
4.62
4.64
4.66
4.68
4.70
4.72

T-TEST PAIRS=PreAux PreEnroll PreAdmin WITH PostAux PostEnroll Postadmin (PAIRED)

/CRITERIA=CI(.9500)

/MISSING=ANALYSIS.

T-Test

Notes

Output Created		07-SEP-2021 09:27:05
Comments		
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	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	7
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.
Syntax		T-TEST PAIRS=PreAux PreEnroll PreAdmin WITH PostAux PostEnroll Postadmin (PAIRED) /CRITERIA=CI(.9500) /MISSING=ANALYSIS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean

Pair 1	PreAux	35.0167%	3	13.08638%	7.55542%
	PostAux	28.3500%	3	23.28860%	13.44568%
Pair 2	PreEnroll	29.1500%	3	0.36014%	0.20793%
	Post Enroll	31.9467%	3	2.76374%	1.59564%
Pair 3	PreAdmin	7.5533%	3	2.60684%	1.50506%
	Postadmin	4.6667%	3	0.04509%	0.02603%

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PreAux & PostAux	3	-.963	.173
Pair 2	PreEnroll & Post Enroll	3	.847	.357
Pair 3	PreAdmin & Postadmin	3	.003	.998

Paired Samples Test

		Paired Differences					
					95% Confidence Interval of the Difference		
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t
Pair 1	PreAux - PostAux	6.66667%	36.06765%	20.82367%	-82.93034%	96.26368%	.320
Pair 2	PreEnroll - Post Enroll	-2.79667%	2.46610%	1.42380%	-8.92279%	3.32946%	-1.964
Pair 3	PreAdmin - Postadmin	2.88667%	2.60709%	1.50521%	-3.58971%	9.36304%	1.918

Curriculum Vita
George Lamar Rutherford, II

Office Phone 662-915-7021

Educational and Professional Credentials

Ph.D.	**2021**	The University of Mississippi	Higher Ed.
M.A.	**2015**	The University of Mississippi	Higher Ed.
B.A.	**2006**	The University of Mississippi	History
B.A.	**2006**	The University of Mississippi	Philosophy
A.A.	**2003**	Mississippi Delta Comm. College	Liberal Arts

Professional Experience

The University of Mississippi

Assistant Director, Center for Research Evaluation, August 2017-Present

Project Manager, Dr. Maxine Harper Center for Educational Research and Evaluation, September 2013-August 2017

Project Coordinator, Center for Educational Research and Evaluation, April 2009-September 2013

Program Coordinator, Center for Educational Research and Evaluation, July 2008-April 2009

Research Aide, Center for Educational Research and Evaluation, September-June, 2008

Secretary, Center for Educational Research and Evaluation, April-September, 2007

Monographs

Gilbert, H., Winburn, J., & Rutherford, J. (2018). *Final Report for the SNAP Recipient Integrity Technology Grant.* University MS: The University of Mississippi, Center for Research Evaluation.

Rutherford, J. (2018). *Fall 2018 Evaluation Report for of the Rebels Reading for Academic Success.* University MS: The University of Mississippi, Center for Research Evaluation.

Winburn, J., Gilbert, H., Sharp, S., & Rutherford, J. (2018). *Interim Report Report of the Hardin Early Childhood Program.* University MS: The University of Mississippi, Center for Research Evaluation.

Winburn, J., Lesseig, C., & Gilbert, H. (2018). *Mid-Year Report for the Delta State Math Science Partnership Project.* University MS: The University of Mississippi, Center for Research Evaluation.

Winburn, J., Sharp, S., Rutherford, J., & Lesseig, C. (2018). *The Evaluation of Building High-Quality Early Childhood System of Leadership and Teaching Practice.* University: MS: The University of Mississippi, Center for Research Evaluation.

Winburn, J., Rutherford, J., & Sharp, S. (2018). *The Evaluation of the William Winter Institute for Racial Reconciliation Humanities in the Public Square Project.* University MS: The university of Mississippi, Center for Research Evaluation.

Winburn, J., & Rutherford, J. (2018). *Summer 2018 Evaluation of the Rebels Reading for Academic Success.* University MS: The University of Mississippi, Center for Research Evaluation.

Winburn, J., Lesseig, C,. & Rutherford, J. (2017). *The Evaluation of the International Research Experience for Student Program.* University, MS; The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Winburn, J., Lesseig, C., & Rutherford, J. (2017). *The Evaluation of the Avenues to Reading Project (2017).* University, MS: The University of Mississippi, DR. Maxine Harper Center for Educational Research and Evaluation.

Barnard, M., Rutherford, J., & Lesseig, C. (2017). *The Evaluation of the National Science Foundation EPSCoR Track II Project Mentoring Report.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Barnard, M., & Rutherford J. (2017). *Follow-Up Report for Parents for Public Schools.* University, MS: The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Barnard, M., Hsu, M., & Rutherford, J. (2017). *The Evaluation of the TELA Program.* University, MS: The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Barnard, M., Rutherford, J., Sharp, S., & Lesseig, C. (2017). *The Evaluation of the National Science Foundation EPSCoR Track II Project Annual Report.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Sharp, S., Barnard, M., & Rutherford, J. (2017). *Interim Evaluation Report for the Graduate Center for the Study of Early Learning.* University, MS: The University of Mississippi, Dr. Maxine Harper for Center for Educational Research and Evaluatuion.

Barnard, M. & Rutherford J. (2016). Annual *Report for Parents for Public Schools.* University, MS: The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Barnard, M., Rutherford, J., Bryant, M. (2016). *The Evaluation of the National Science Foundation EPSCoR Track II Project.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Wolff, L., Hsu, M., & Rutherford, J. (2016). *The Evaluation of the TELA Program.* University, MS: The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Wolff, L., & Rutherford, J. (2016). *The Evaluation of the Rebels Reading for Academic Success.* University MS: The University of Mississippi, Center for Educational Research and Evaluation.

Wolf, L., & Rutherford, J. (2016). *The Evaluation of the International Research Experience for Student Program.* University, MS; The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Wolff, L., Rutherford, J., Bryant, M., Kandoi, H., Leatherman, S., & Fowlkes, E. (2015). *The Evaluation of the Reading Bear Program.* University, MS: The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Wolff, L., Rutherford, J., Bryant, M. (2015). *The Evaluation for the Fall Semester of Rebels Reading for Academic Success.* University MS: The University of Mississippi, Center for Educational Research and Evaluation.

Wolff, L., Bryant, M., & Rutherford J. (2015). *Year 2 Follow-Up Report for Parents for Public Schools.* University, MS: The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Wolff, L., Hsu, M., Rutherford, J., Bryant, M., & Kandoi, H. (2015). *The Evaluation of the TELA Program.* University, MS: The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Harper, M., Rutherford, J., Bryant, M. (2015). *The Evaluation for the Spring Semester of Rebels Reading for Academic Success.* University MS: The University of Mississippi, Center for Educational Research and Evaluation.

Wolff, L., Hsu, M., Rutherford, J., Bryant, M., & Kandoi, H. (2014). *The Evaluation of the TELA Program.* University, MS: The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Wolff, L., Rutherford, J., & Bryant, M. (2014). *A Cumulative Evaluation of the Center for Excellence in Literacy Instruction.* University, MS: The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Harper, M., Rutherford, J., & Bryant, M. (2014). *Evaluation of Parents for Public Schools Program.* University MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., Rutherford, J., Bryant, M. (2014). *The Evaluation of the National Science Foundation EPSCoR Project.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Wolff, l., Bryant, M., & Rutherford J. (2013). *Year 1 Follow-Up Report for Parents for Public Schools.* University, MS: The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Wolff, L., Bryant M., & Rutherford J. (2013). *The Evaluation of the Three Rivers Planning and Development Project.* University, MS: The University of Mississippi, Dr. Maxine Harper Center for Educational Research and Evaluation.

Harper, M., Rutherford, J., Bryant, M. (2013). *The Evaluation of the National Science Foundation EPSCoR Project.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., Rutherford, J., Bryant, M. (2013). *The Evaluation for the Spring Semester of Rebels Reading for Academic Success.* University MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., Rutherford, J., & Bryant, M. (2013). *Evaluation of Parents for Public Schools Program.* University MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., Rutherford, J., & Bryant, M. (2012). *A Cumulative Evaluation of the Center for Excellence in Literacy Instruction.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., Rutherford, J., & Bryant, M. (2012). *The Evaluation for the Fall Semester of Rebels Reading for Academic Success.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2012). *Evaluation for the Rebels Reading for Academic Success. (2012).* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2012). *Evaluation for the Center for Excellence in Literacy instruction (2011-2012).* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2011). *Evaluation for the Center for Excellence in Literacy Instruction (2010-2011).* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2011). *Evaluation of the Lott Leadership Institute Exchange Programs with South Africa, Germany and Ecuador.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2010). *Evaluation Report for the World Science Festival Exhibition of the Laser Interferometer Gravitational-Wave Observatories (LIGO).* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2010). *Evaluation of the Lott Leadership Institute Exchange Programs with Argentina, South Africa and Japan.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., Logan, K., Bryant, M., & Rutherford, J. (2010). *The Evaluation of America Reads Mississippi (2009-2010).*University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., Logan, K., & Rutherford, J. (2010). *Evaluation of MS-EPSCoR Computational Science Workshop.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2010). *Evaluation for the Center for Excellence in Literacy Instruction (2009-2010).* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & and Rutherford, J. (2009). *Evaluation of Laser Interferometer Gravitational Wave Observatory: Traveling Exhibit.* University, Mississippi: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2009). *Evaluation for the Center for Excellence in Literacy*

Instruction (2008-2009). University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2009). *The Evaluation of America Reads Mississippi (2008-2009).*University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2009). *Evaluation of the Center for Intelligence Securities Studies: Four Eyes Analytics Conference*. University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2008). *Evaluation of the Effectiveness of the Product "Understanding Fisheries Management": A Manual for Understanding the Federal Fisheries Management Process*. University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2008). *Evaluation of National Education Forum.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Harper, M., & Rutherford, J. (2008). *The Evaluation of America Reads Mississippi 2007.* University, MS: The University of Mississippi, Center for Educational Research and Evaluation.

Presentations

Sharp, S., & Rutherford, J. (November, 2019). Tracking in a new generation. Roundtable discussion presented at the 2019 American Evaluation Association Conference, Minneapolis, MN.

Gilbert, H., Winburn, J., Sharp, S., & Rutherford, J. (October, 2018). *Educator Self-Efficacy and the Mediation of Professional Development on Student Outcomes.* Poster Presented at the 2018 American Evaluation Association Conference, Cleveland, OH.

Sharp, S., Winburn, J., Gilbert, H., & Rutherford, J. (October, 2018). *Impact of Educator Training on Knowledge Gained and Student Learning Outcomes.* Poster Presented at the 2018 American Evaluation Association Conference, Cleveland, OH.

Rutherford, J., Winburn, J., Gilbert, H., & Sharp, S. (October, 2018). *Association Between Career Expo Interactive Experience and Student and Student Outcomes.* Poster Presented at the 2018 American Evaluation Association, Cleveland, OH.

Honors and Awards

Phi Kappa Phi- Chapter at the University of Mississippi.

Phi Alpha Theta – The History Honor Society, The University of Mississippi.

Management and Administration Seminars for Human Resources (MASH) – The University of Mississippi.

Research Administration and Management Program (RAMP) – The University of Mississippi.

Certificate of Appreciation for 10 Years of Service to The University of Mississippi, (2018).