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An Analysis of Performance-Based Funding Policies at an Open Access Institution

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AN ANALYSIS OF
PERFORMANCE-BASED FUNDING POLICIES
AT AN OPEN ACCESS INSTITUTION

by

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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Education
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ABSTRACT

Performance-based funding policies have become popular among state legislators seeking ways to hold public higher education institutions accountable. Approximately 30 states currently use performance-based funding policies to tie state appropriations to institutional outcomes according to a defined set of metrics. Despite the popularity of the policy approach, very little empirical evidence exists to suggest that performance-based funding is effective in producing the often-intended outcomes of increased student retention and degree attainment rates. Numerous studies have indicated that these policies may produce unintended outcomes including the restriction of access, the gaming of performance-based funding systems, and the widening of equity gaps. This quantitative study employed an independent t test assuming unequal variances to investigate the effectiveness of performance-based funding policies on student retention by comparing the retention rates of full-time, first-time-in-college (FTIC) students by race, gender, and Pell grant eligibility for the four years following the implementation of these policies at a single Florida College System institution. This study also sought to determine if differences exist among enrollment rates for these same variables following the implementation of performance-based funding policies. Though findings were mixed, results revealed that in most cases there were statistically significant differences among the retention and enrollment rates across the variables of race, gender, and Pell Grant-eligibility for the sample of fulltime FTIC students following the implementation of PBF policies. Based on the study findings, policy recommendations are proposed to enhance the effectiveness of the performance-based funding policies for the Florida College System.

I dedicate my dissertation to my loving family who have shown me endless support and love throughout my doctoral program. I thank my wife Nicole Whetstine for her love, confidence, and willingness to join me on this journey. I would not and could not have done this without you. I am grateful to my sons Henry and Lucas for their patience and understanding and the sacrifices they have made which have allowed me to reach this milestone. A special thanks to my in-laws; Joe and Alba Perez for believing in me, never wavering in their support, and their willingness to care for our boys while Nicole and I were enrolled in evening classes and working towards deadlines.

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CHAPTER ONE: INTRODUCTION

Higher education in the United States has received demands from policy makers and taxpayers for increased accountability for nearly half a century. Performance-based funding (PBF) has become a signature aspect of the higher education accountability movement in the United States, implemented in response to concerns that public higher education institutions have failed in their mission to retain and graduate students (Dougherty, 2016). Although approximately 30 states currently use PBF policies to connect appropriations to institutional outcomes, there is little empirical evidence to suggest that these policies are successful (Umbricht et al., 2017; Hillman et al., 2018). A recent systematic synthesis of research exploring the intended and unintended outcomes of PBF policies by Ortagus et al. (2020) suggests that PBF policies may create unintended outcomes that are especially problematic for under-resourced institutions and those who primarily serve underrepresented student populations.

PBF policies are particularly problematic for community colleges who, because of their open-access admissions policies and wide-range of academic program offerings, serve as one of the few academic pathways in higher education available for underserved students (Rios-Aguilar & Deil-Amen, 2019). As a result of these institutional characteristics, community colleges are limited in their understanding of their students' academic goals and level of commitment than other more-selective higher education institutions. Community college leaders have suggested that because of the comprehensive missions of these institutions, the variety of the students that they enroll, and variations among the level of academic preparedness of the students they serve, measures such as student retention and completion rates are inappropriate to gauge institutional success and alternative measures that better align with the institutional missions of community

colleges are needed. Despite these concerns, many state legislatures have enacted PBF policies that prioritize student retention and completion and use these metrics to formulate the rate of state allocations community colleges receive.

The Florida College System's (FCS) PBF model, implemented in 2016, reflected these national trends by linking a portion of state allocations to the retention, completion, and job placement rates of cohorts of full-time, first-time-in college (FTIC) students. This model presents a challenge for FCS institutions as this student profile represents a fraction of their total student body. As such, the FCS PBF model incentivizes institutions to prioritize the success of one group of students over all others and ignores these institutions' broad missions and range of program offerings. This study investigates the effectiveness of these PBF policies at a single FCS member institution by comparing the retention rates of full-time, FTIC students by race, gender, and Pell Grant eligibility for the four years following the implementation of these policies. This study also seeks to determine if differences exist among enrollment rates for these same variables following PBF implementation. By doing so, this study explores the intended and unintended outcomes of the FCS's PBF model. This work contributes to the PBF literature by examining how the overall effectiveness of PBF policies is associated with how accurately they reflect the full range of institutional outcomes of the institutions they are designed to measure.

Background

Community Colleges contribute to the nation as an engine of economic growth and opportunity, serving over 13 million students annually over a range of credit and non-credit courses and programs (AACC, 2012). Open enrollment policies are a defining characteristic of these institutions which have historically provided access to higher education for everyone,

regardless of academic performance or social-economic standing (Dougherty, 2001). Community colleges today have evolved into comprehensive educational institutions focused on serving the needs of their local communities. A significant portion of the students served by these institutions are under-prepared academically and require developmental education. These students face significant challenges to degree attainment and as a result, nearly half of all community college students do not satisfy the commonly held success metrics of degree attainment or transfer to a four-year-institution (AACC, 2012).

PBF policies are especially challenging for open access community colleges, particularly those institutions who enroll sizable populations of historically underrepresented students. Empirical studies have indicated that institutions who enroll large proportions of Hispanic students, Black students, part-time students, and adult learners receive significantly less PBF than institutions who enroll mostly Caucasian students (McKinney and Hagedorn, 2017). Rios-Aguilar and Deil-Amen (2019) refer to this phenomenon as the “community college disadvantage” (p. 128). The authors suggest that PBF policies further complicate the financial crisis many of these institutions have endured as community colleges nationally have faced declining state appropriations over the last two decades. The authors warn that the nation’s community colleges “already serve the underserved half of high school students; these students are now at risk of becoming the new forgotten half of community college students: credits but no degree” (p. 129).

Problem Statement

Policymakers at the state and federal levels have placed increased pressure on the higher education sector to produce highly skilled workers to support the overall productivity of the

American workforce. However, state appropriations to higher education institutions have eroded over the last decade and have not yet recovered from losses realized during the Great Recession (Mitchel et al., 2014). Many state legislatures across several states have introduced performance-based funding (PBF) measures that tie a portion of an institution's state allocations to institutional outcomes that commonly include student retention, completion, and job placement rates to increase accountability in higher education and support economic expansion. As a result, many higher education institutions now face increased accountability while also experiencing historically low state appropriation levels.

A recent synthesis of PBF scholarship suggests that the adoption of PBF policies is associated with null or modest positive impacts on these policy's intended outcomes of student retention and graduation rates (Ortagus, et al., 2020) Instead, PBF policies often produce unintended outcomes that include the restriction of access, the gaming of PBF systems, and can particularly disadvantage underrepresented student populations and less-resourced institution types (Gandara & Rutherford, 2017). PBF policies are particularly problematic for open-access community colleges, and effectively turn the open-access policies of these institutions into a disadvantage (Rios-Aguilar & Deil-Amen, 2019).

The Florida College System's (FCS) PBF model implemented in 2016 presented a challenge for Florida's community colleges by limiting its success metrics to a cohort of fulltime, FTIC students, a student population that represents just a fraction of most of these institutions' overall student enrollments. This approach incentivizes institutions to prioritize the success of one student group over all others and fails to measure the full range of institutional outcomes these colleges produce. This misalignment can lead community colleges to focus limited institutional resources in ways that maximize PBF metrics. In doing so, institutions may

reduce resources in other areas not directly measured by PBF which may produce unintended negative outcomes (Dougherty, et al., 2016; Hillman, 2016). If policymakers are to continue to rely on PBF policies to communicate state-level goals with community colleges, they should design these policies in ways that are better aligned with and support the full missions of these institutions (Dougherty, et al., 2016; Li, 2017).

Theoretical Framework

Principle-agent theory (Jensen & Meckling, 1976) will serve as the Theoretical framework to guide this study. Principle-agent theory is concerned with relationship between the principle and their agents and is applicable to the relationship between states (principles) and public colleges (agents) as demonstrated in previous research on performance-funding policies (Pheatt et al., 2014; Hillman et al., 2015; Li, 2017). Originally established in the field of economics and later applied to political science, principle-agent theory posits that principles establish contractual agreements with agents which are designed to support the goals of the principle (Lane, 2007; Weimer & Vining, 2011; Dougherty, et al., 2016). Principle-agent theory recognizes that principles and agents are self-interested actors that hold separate and sometimes opposing interests which can result in agents behaving in ways that run counter to the interests of the principles (Bohren, 1998). The theory acknowledges that information asymmetry can occur between principles and agents demonstrated by agents having increased knowledge about their own capacity, activities, and behaviors than do principles (Kivistö, 2008). Principles use policy instruments that leverage financial incentives and the provision of information to inform agents of goals and secure their compliance (Stone 2012; Dougherty, et al., 2016). Principle-agent theory is applied to the study of performance-funding to understand how state legislatures use

agreements, oversight, incentives, and sanctions to align institutional activities with statewide goals (Dougherty et al., 2013; Dougherty & Reddy, 2013; Dougherty et al., 2016).

As described by Dougherty, et al. (2016), performance funding models are a neo-liberal policy instruments designed to align the priorities of the principle with the agent by making a portion of state allocations for these institutions dependent on the performance of certain metrics. As such, the principle-agent theory will be applied to this study to describe the relationship and interactions that occur between the policymakers at the state level and at the institutional level of a public comprehensive community college of which falls under the oversight of the policymakers. In this way the policymakers serve as principles and the community college serves as the agent. Through the development and implementation of the state's performance funding model, state policymakers sought to align institutional activities with state goals for higher education.

Purpose Statement

The purpose of this study is to examine the impact of performance-based funding (PBF) policies on a public community college with an open-access mission following the quantitative research methodology. The study will evaluate the level of success these polices had on their intended outcome of increased student retention by comparing the retention rates of full-time, first-time-in-college (FTIC) students by race, gender, and Pell Grant eligibility for the four years following the implementation of these policies. This study also seeks to determine if differences exist among enrollment rates for these same variables following PBF implementation. By doing so, this study will explore the intended and unintended outcomes of the FCS's PBF model. This

study will provide a better understanding into the institutional characteristics and environment in which these policies were applied, answering the call made by Ortagus et al. (2020) to examine the circumstances which may “confound and inform analyses of the impact of PBF adoption” to better understand the precise conditions that impact the outcomes of PBF policies (p. 543).

Research Questions

This study seeks to increase understanding of the impact of PBF policies on a public open-access community college. Specifically, this study examines the following questions:

1. Are there statistically significant differences among the retention rates of White students and minority students following the implementation of PBF policies?
2. Are there statistically significant differences among the retention rates of female students and male students following the implementation of PBF policies?
3. Are there statistically significant differences among the retention rates of non-Pell Grant-eligible students and Pell Grant-eligible students following the implementation of PBF policies?
4. Are there differences among enrollment rates for race, gender, and Pell Grant-eligibility at the time of enrollment following the implementation of PBF policies?

Significance of the Study

Although there is an expanding body of scholarship on the intended and unintended outcomes of PBF policies, few studies examine these outcomes in the institutional context in

which they occur (Ortagus et al., 2020). This inquiry draws directly from the work of Kelchen and Stedrak (2016) to determine if the implementation of PBF policies spurs institutional adjustments that promote or hinder enrollment and retention among certain student demographics. This work also pulls directly from that of Rios-Aguilar & Deil-Amen (2019) by suggesting that such institutional adjustments that negatively impact underserved student populations are especially problematic for Community colleges who, because of their open-access admissions policies and wide-range of academic program offerings, serve as one of the few academic pathways in higher education available for underrepresented students. The results of this study will provide meaningful insight into how institutional characteristics such as geographic location, size, and student populations aid or impede the intended outcomes of these policies. The results will help policy makers and campus leaders to better understand the intended and unintended consequences of incentive funding models on open access institutions and will provide meaningful discussions to guide future policy considerations.

Limitations of Study

1. The study is limited to one public open-access community college in the Southeast.
2. The study is limited to examining the PBF outcome of student retention.
3. The study is unable to account for other contextual factors that influence student retention.
4. The study relies on aggregated data provided as an institutional dataset.
5. The duration of the study was limited to a period of four years of institutional data.

Delimitations

The delimitations placed on this study by the researcher are designed to provide a deeper understanding of how the FCS's PBF model has impacted its targeted student cohort of fulltime, FTIC students. Towards this goal, the study only examines the retention rates of this student cohort by race, gender, and Pell Grant-eligibility for the four years following the implementation of these policies. This study also seeks to determine if differences exist among enrollment rates for these same variables following PBF implementation. As such, this study does not investigate the impact of the FCS's PBF model on the entire student body enrolled in a range of academic programs from adult education, vocational, and baccalaureate degrees. In addition, the retention rates compared in this study are one of several success metrics embedded in the FCS PBF model. The researcher has chosen to focus on the impact of the FCS's PBF model on this one measure as it is representative of the central purpose of this model: retaining students on their academic pathway towards the goal of degree attainment. Finally, the FCS has updated its PBF model several times since it first implemented this policy in 2016. For example, the latest model implemented in 2020 includes several modifications including the addition of incentive funding separate from an institution's base state-allocation, metrics linked to gateway course success rates and metrics that measure workforce program success. The researcher has chosen to not include the latest version of the FCS's PBF model in this study as the data regarding these outcomes was limited to a single academic year.

Assumptions

This study includes the following assumptions: (a) the institutional data included in this study is accurate and complete; (b) the student cohort analyzed in this study is representative of the cohort measured by the FCS PBF policies and provides a basis for comparison; (c) the central intended outcome of the FCS's PBF model is retaining students on their academic pathway towards the goal of degree attainment; and (d) the phenomena observed as a result of the implementation of the FCS's PBF policy at the single FCS member institution included in this study is representative of the outcomes of these policies on the other twenty-seven FCS member institutions.

Definition of Terms

Completion Rates: The percentage of students who have satisfied all the requirements of an academic program during a specific period of time compared to the percentage of students who have not satisfied all of the requirements of the same academic program during the same period.

First-time in College: A student enrolled in a post-secondary institution who has not attended a postsecondary institution previously since the time of their high school graduation.

Four-Year Institution: Public higher education institutions that provide undergraduate post-secondary education programs that lead to a bachelor's degree. These include universities and liberal arts colleges. These institutions often offer graduate programs.

Full-time: A student enrolled in a minimum of 12 credit hours per semester during the fall and spring semesters.

Part-time: A student enrolled in less than 12 credit hours per semester during the fall and spring semesters.

Performance-Based Funding: an accountability policy in higher education that ties a portion of an institution's state allocations to a set of student outcomes (Ortagus et al., 2020).

Persistence Rates: The ability to keep students on their academic pathway towards degree attainment, measured by the number of students enrolled in a given semester who maintain their enrollment in the subsequent semester (i.e. fall to spring; spring to fall).

Open-Access: An institutional admissions policy that provides all members of a community a pathway to attain a college education (Mullin, 2017).

Retention Rates: The ability to keep students on their academic pathway towards degree attainment, measured by the number students enrolled in a fall semester compared to those enrolled in the subsequent fall semester (i.e. fall to fall).

Two-Year Institution: Public higher education institutions that primarily provide lower-level post-secondary education often through Associate of Arts, Associate of Science degree pathways and certificate programs, often referred to as junior colleges, community colleges, and in some cases state colleges.

Underrepresented: Populations of students with characteristics which are not representative of those historically served by post-secondary institutions including low-income students, first-generation students, and students of color (Green, 2006).

Organization of the Study

This research study is organized in five chapters. Chapter One provides the introduction to the study and includes the background of the study, the problem statement, the conceptual framework, the purpose of the study, research questions, the significance of the study, limitations of the study, delimitations of the study, assumptions, and definition of key terms. Chapter Two provides a review of the literature of PBF policies and the scholarship on the intended and unintended consequences of these policies. Chapter Three provides a detailed explanation of the quantitative research design of this study. Chapter Four provides a detailed review of the findings of the study. Chapter Five provides a summary of the complete study including a discussion of the findings, implications, considerations for future research, and conclusions.

Summary

This study examines the intended and unintended outcomes of the Florida College System's (FCS) performance-based funding (PBF) model by investigating the impact of this policy on student retention rates at a single FCS member institution. Following a quantitative methodological approach, this study compares the retention rates of full-time, FTIC students by race, gender, and Pell Grant eligibility for the four years following the implementation of these policies. This study also seeks to determine if differences exist among enrollment rates for these same variables following PBF implementation. This work contributes to the PBF literature by suggesting that the overall effectiveness of PBF policies is associated with how accurately they account for the specific characteristics and operating environments of the institutions they are designed to measure.

CHAPTER TWO: LITERATURE REVIEW

This chapter provides a review of the literature on performance-based funding (PBF) policies and higher education. This section introduces the American community college and describes the role these institutions have served over the last century. The historical funding of community colleges is reviewed along with the emergence of the nation's higher education accountability movement. A review of the history of PBF policies in the United States is provided. This chapter presents a thorough review of existing PBF research and highlights both the effectiveness of these policies in achieving their intended outcomes and the tendency for these policies to create unintended outcomes. This chapter concludes by linking the existing PBF research to this study's conceptual framework and research questions.

Today's Comprehensive Community College

Community Colleges contribute to the United States as a source of economic growth and opportunity, serving over 13 million students annually and offering a range of credit and non-credit courses and programs (AACC, 2012). The American community college of today serves as a multivalent institution that offers a broad range of programs and credentials and follows multiple, sometimes conflicting institutional missions (Baime & Baum, 2016; Dougherty & Townsend, 2006). Today's comprehensive community college simultaneously supports the missions of remedial education, career development, student services, continuing education, community education, vocational education, liberal arts education, and their transfer function (Cohen & Brawer, 2003).

The open enrollment policies of community colleges serve as one of their defining characteristics and historically have provided access to higher education for everyone, regardless of academic performance or social-economic standing (Dougherty, 1994). Community colleges today have evolved into comprehensive educational institutions focused on serving the diverse needs of their local communities while also advancing the national priorities of educational attainment and workforce development (Baine & Baum, 2016). Community colleges' open-access admissions policies, variety of program offerings, and affordable tuition rates provide access to higher education to many underserved students, including low income and minority students, many of which are under-prepared academically and require developmental education (Deil-Amen & DeLuca, 2010). These students face considerable challenges to degree attainment and as a result, nearly half of all community college students do not satisfy the commonly held success metrics of degree attainment or transfer to a four-year-institution (Bailey, et al., 2015).

The Open Access Mission of Community Colleges

Community colleges have served an important role in the United States' higher education system by providing access to higher education to a substantial portion of the American population for more than half a century (Thelin, 2019). A key characteristic of the American community college is their open-access admission policies which allow these institutes to provide access to all who can benefit (Shannon & Smith, 2006). In turn, these institutions have historically offered a wide variety of programs including college-level programs aimed to prepare students for transfer, vocational, remedial, continuing education, and non-credit community enrichment programs (Grubbs, 2020). Today's community colleges serve three distinct student populations simultaneously: academic, vocational, and underserved (Deil-Amen

& Deluca, 2010). Academic-track students are provided with a rigorous college preparatory curriculum aimed to prepare them for further success in post-secondary education and onto meaningful occupations. Students on the vocational track receive preparation to join the labor force in high-demand trades. However, the underserved students are neither prepared for college or career and rely on community colleges to provide them with remedial and adult education opportunities in hopes to one day be prepared for a college or vocational track program or to transition directly to the workforce.

The Florida College System

Leroy Collins was elected as Florida's thirty-third governor in 1954 and is credited with overseeing the expansion of the state's community college system (Wattenbarger & Albertson, 2007). Smith (1994) notes that during the 1950's, Florida's policymakers were investigating ways to move the state's economy from mostly agricultural to a more tourism-based economy. The author recounts that during this period, Florida had only five public junior colleges and like many states at the time, was interested in the potential impact the expansion of the community college model could have on the state's economy. As such, the Florida Legislator established the Community College Council in 1955 and charged the body with conducting a study to determine the potential of the community college model on the state and its economy. The resulting report entitled *The Community Junior College in Florida's Future* was presented to the Florida Legislature in 1957 and recommended for the dramatic expansion of Florida's junior colleges to expand access to higher education throughout the state, increase postsecondary degree attainment, and support the expansion of the state's economy (Wattenbarger & Albertson, 2007). The state legislature endorsed the plan and set out that same year to begin expanding the state's

community college system. The completion of Pasco Hernando Community College in 1972 marked the end of the expansion of the Florida College System which ultimately resulted in a system of twenty-eight institutions, geographically distributed throughout the state “within commuting distance of most of Florida’s population” (Smith, p. xvi).

Historical Funding of Community Colleges

Community colleges, like most other public higher education institutions, are funded primarily by a mixture of state appropriations and tuition revenues (Dougherty and Reddy, 2013). Historically, salaries and benefits for faculty and staff and funding to support the operation and maintenance of the central plant account for an institution’s largest budget items and tend to be somewhat fixed costs year to year (Hillman, 2016). As such, funding for public community colleges has traditionally been provided by states annually at a rate calculated based on prior appropriations and the number of students enrolled (Layzell, 1999). Community colleges have historically generated additional revenue through tuition and fees, and in some cases from additional appropriations from local municipalities (Baime & Baum, 2016). The receipt of sufficient appropriations from state and local municipalities have been critical to the ability of these community colleges to serve as a low-cost option for higher education as affordable tuition rates have been an important component of the open-access mission of community colleges (Bailey, et al., 2015).

State appropriations for public higher education have declined for the past three decades and have deferred these costs to students and their families in the form of increased tuition rates (Hillman, 2016). As noted by Rios-Aguilar and Deil-Amen (2019), the Great Recession of the

early 2000's resulted in a period of disinvestment by states in higher education that has disproportionately affected community colleges where the proportion of expenditures covered by net tuition revenue rose from 26 to 39 percent during the period of 2003 to 2013. Spending per full-time equivalent student (FTE) decreased at community colleges during the same period at an average of \$904 while public 4-year institutions saw an increase in spending per FTE of \$2,700.

Student Success and Completion

An increased demand for credentialed workers and the rising cost of higher education helped to create a public accountability movement in the early 2000's that prioritized degree attainment for public higher education (St. John, et al., 2018). At the time, higher education leaders and researchers called for urgent reforms to both expand access to higher education and improve the retention and completion rates of undergraduate students (American Association of Community Colleges, 2012; Bailey, et al., 2015). The federal government responded to these calls for reforms by forming the Commission on the Future of Higher Education, led by then Secretary of Education Margaret Spellings. The Commission issued *A Test of Leadership: Charting the Future of U.S. Higher Education*, which outlined a national strategy for the reform of higher education and advocated for greater accountability of colleges and universities (St. John, et al., 2018). The report suggested that there was “inadequate transparency and accountability for measuring institutional performance” in higher education and advocated for increased comprehensive institutional data be provided to policymakers to “help them decide whether the national investment in higher education is paying off and how taxpayer dollars could be used more effectively” (Spellings, 2006, p. 14).

The accountability movement of the early 2000's emphasized improving student retention. Although higher education has long studied student retention (Gekoski & Schwartz, 1961; Panos & Astin, 1968; Feldman & Newcomb, 1969; Tinto, 1975), the introduction of state and federal policies aimed at increasing student persistence and degree attainment rates are a relatively recent and understudied phenomenon (St. John, et al., 2018). Despite their high enrollments, community colleges typically have low student retention and completion rates, explained in part by the large numbers of underprepared students they serve (Rios-Aguilar & Deil-Amen, 2019). These institutions enroll half of high school graduates who are unprepared for the college and vocational levels, termed *the underserved half*. Without the support of community colleges to provide access to remedial and adult education programs designed to better prepare students for post-secondary education, this *underserved half* is “at risk of becoming the new forgotten half of community college students: credits but no degree” (p. 129).

The variation among community colleges' missions and program offerings complicate how student success is measured within their institutional context (Baime & Baum, 2016). The diversity of institutional missions highlights how the accountability movement that has swept higher education and spurred a wave of performance-funding 2.0 policies has been especially problematic for community colleges. PBF policies applied to community colleges are often modeled after similar systems first applied to public universities which prioritize student retention and degree completion as success metrics (Dougherty, 2016). Though degree attainment serves as a reasonable assumption regarding the goals of students enrolled in 4-year institutions, because of their diverse student body, the goals of community college students are less concrete and more changing in nature (Bailey, et al., 2007).

Performance Funding

A considerable amount of research has been conducted recently on the implementation and outcomes of performance-based funding (PBF) policies which has been systematically reviewed by Dougherty and Reddy (2013) and synthesized by Ortagus, et al. (2020). PBF policies adjust the level of state appropriations a college or university receives based on the institution's performance on a specific set of metrics such as student persistence, retention, completion, transfer, and job placement rates (Dougherty, et al., 2016). The introduction of PBF policies marks a departure from how public higher education institutions have been historically funded, often calculated by student enrollment rates and prior-year funding levels (Lingenfelter, 2008). PBF policies reflect concerns among policymakers that colleges and universities have little financial incentive to prioritize degree attainment (Hillman, 2016).

Performance Funding 1.0 vs. 2.0

PBF policies were first introduced to the United States higher education system by Tennessee in 1979 (Dougherty, et al., 2016). Early PBF models, referred to as PBF 1.0, gained popularity in the 1990's and provided institutions with an average of 1 – 5% of supplemental funding in addition to their base appropriations which were linked to institutional performance on student outcomes (Dougherty, et al., 2012). Incentive appropriations were difficult to provide during lean economic times of the mid-2000s and mostly disappeared when state governments were forced to reduce spending in response to the economic crisis brought on by the Great Recession. In the late 2000's PBF policies regained popularity as state legislators sought ways to hold institutions of higher education accountable for their outcomes. The second wave of these

policies, referred to as PBF 2.0, was different from earlier models in two important ways. First, PBF 2.0 tied a portion of base state appropriations to performance measures in an attempt by state legislators to make PBF policies recession-proof. Second, PBF 2.0 put a much larger portion of state appropriations at stake, with several states linking as much as 10% or and, in some cases, up to 25% or more of state appropriations to performance outcomes (Dougherty et al., 2016; Ortagus et al., 2020). These policies were implemented during a period where state appropriations to higher education institutions were at historically low rates, having eroded over the previous decade and not yet recovered from losses realized during the Great Recession (Mitchel, et al., 2014).

Performance Funding Research

PBF policies are designed to improve specific institutional outcomes through the provision of financial incentives (Burke, 2002; Dougherty et al., 2016). Research on PBF policies can be organized into two broad categories: those who investigate the conditions in which states implement or discontinue these policies and research that explores the effectiveness of these policies on both institutional response and on student outcomes (Ortagus, et al., 2020).

Performance Funding Adoption

As noted in Table 1, forty-one states have adopted PBF policies at some point in time as of the 2020 fiscal year, (Ortagus, et al., 2020). The scholarship related to PBF adoption is divided into two groups, the first focused on PBF 1.0 adoption and the other on PBF 2.0 adoption. In their analysis of the origins of PBF 1.0 policy adoption in the states of Florida,

Illinois, Missouri, South Carolina, Tennessee, and Washington during the period between 1979 and 1997, Dougherty, et al., (2013) identified two central political coalitions advocating for the adoption PBF 1.0 policies. The first of these coalitions were public higher education institutions and state higher education coordinating boards seeking to identify additional state funding for higher education during a period where increased taxation was unfavorable and there was growing criticism over the effectiveness and efficiency of higher education. The authors identify state business leaders, governors, and state legislators as the second key advocacy coalition, motivated by a shared belief that the public sector was largely inefficient and would benefit from a more business-like approach.

Similar work by McLendon, et al. (2006) investigated how changes to sociopolitical systems over time encourage the adoption of accountability policies in higher education. Through the conduction of an event history analysis, the author's found that PBF 1.0 policy implementation was primarily predicted by the strength of the legislative party and the design of higher education governance arrangement. More specifically, the authors determined that the portion of a state's legislature that identified as a member of the Republican party and the existence of a "consolidated governing board affected the probability of adoption in statistically significant ways" (p. 11). These findings align well with those of Dougherty, et al. (2013), who suggest that the demand from state business leaders were an important factor in the development of an ideological atmosphere that presented PBF 1.0 policies as an attractive policy tool for state legislators.

The way in which state legislators adopted PBF 2.0 policies differed in important ways from the PBF 1.0 adoption. Dougherty, et al. (2016) investigated the adoption of PBF 2.0 policies in the states of Indiana, Ohio, and Tennessee. The authors chose these states due to their

early adoption of PBF 2.0 policies and because the states differed in important ways regarding their history of PBF policies and their political and socioeconomic structures. The study drew from over 260 interviews with higher education stakeholders including college and university administrators, faculty, and state-level political actors. The study also employed document analysis and reviewed public agency reports, empirical studies, and newspaper articles to inform their work. The authors found that the roots of PBF 2.0 policies in these three states were distinctively different from those of PBF 1.0 policies in four noteworthy ways. Although the study's findings indicated that higher education coordinating boards continued to serve an important role in predicting PBF policy adoption, the influence of governors was considerably greater than during PBF 1.0 adoption. The authors found that during the development of PBF 2.0 policies, governors leveraged their roles and solicited and endorsed proposals from coordinating boards to seek new recommendations on approaches to funding higher education. Like earlier findings by Dougherty, et al. (2013) and McLendon, et al. (2006) on PBF 1.0 adoption, Republican party affiliation among state governors was a predictor of PBF 2.0 policy adoption.

A marked difference from the first wave of PBF adoption was the role that outside actors played in the adoption of PBF 2.0 policies. Dougherty, et al. (2016) credit policy groups and philanthropic organizations including the Lumina Foundation and Gates Foundation as important sources of recommendations for PBF 2.0 policies. The authors note that although the existence of state coordinating boards continued to be a predictor of PBF policies, the motivation of these boards had shifted during the second PBF wave to focus more on concerns surrounding accountability of higher education from their earlier efforts related to identifying new higher education funding sources. Finally, results from the study indicated that the state of the economy following the Great Recession of 2007 influenced the design of PBF 2.0 policies. As states were

left with few fiscal resources following this economic crisis, policymakers chose to maintain PBF metrics, but tied them to a percentage of base appropriations instead of providing additional appropriations as was characteristic of PBF 1.0 models.

Table 1. States with PBF policies at some point in time as of FY 2020

PBF State		PBF State		PBF State	
State	(Y/N)	State	(Y/N)	State	(Y/N)
Alabama	Y	Louisiana	Y	Ohio	Y
Alaska	N	Maine	Y	Oklahoma	Y
Arizona	Y	Maryland	Y	Oregon	Y
Arkansas	Y	Massachusetts	Y	Pennsylvania	Y
California	Y	Michigan	Y	Rhode Island	Y
Colorado	Y	Minnesota	Y	South Carolina	Y
Connecticut	Y	Mississippi	Y	South Dakota	Y
Delaware	N	Missouri	Y	Tennessee	Y
Florida	Y	Montana	Y	Texas	Y
Georgia	N	Nebraska	N	Utah	Y
Hawaii	Y	Nevada	Y	Vermont	N
Idaho	Y	New Hampshire	N	Virginia	Y
Illinois	Y	New Jersey	Y	Washington	Y
Indiana	Y	New Mexico	Y	West Virginia	N
Iowa	N	New York	Y	Wisconsin	Y
Kansas	Y	North Carolina	Y	Wyoming	Y
Kentucky	Y	North Dakota	Y		

Adapted from Ortagus, et al. (2020)

Performance Funding Discontinuation

Despite the vast adoption of PBF policies by state legislators, approximately two-thirds of PBF adopting states have discontinued these policies at some point following their implementation (Dougherty, et al., 2013; Ortagus et al., 2020). Early work on the discontinuation of PBF policies by Burke & Modarresi (1999; 2001) identified several characteristics of stable and unstable PBF programs. In their study on PBF policies in Tennessee and Missouri, the authors identified characteristics of stable PBF programs by comparing survey responses from these states to those from four other states that had discontinued the adoption of these policies. Their findings suggest that stable PBF policies are likely to be developed with important input from state governing boards, be designed with the central goals of improving the quality of higher education through increased state funding, value quality more than efficiency, provide sufficient time for planning and implementation, include a limited number of success metrics, occur in states with stable priorities, and include mechanisms that mitigate the costs associated with data collection and analytics. The authors also suggest that more stable PBF policies include carefully chosen performance indicators, are designed with the recognition that measuring higher education outcomes can be difficult and provide protections for institutional diversity.

Building upon their previous work, Burke & Modarresi (2001) surveyed state and campus policymakers in five states. The authors compared the results from Missouri and Tennessee, identified as having more stable PBF policies, to those from Florida, Ohio, and South Carolina, identified as having less-stable policies. The authors coded the responses and utilized a discriminant approach to analyze the results. Their findings aligned with their earlier work and found that states with more stable PBF programs developed these policies with the input of

coordinating boards which were prioritized over those from outside or peripheral organizations. They found that survey responses from states with more stable PBF policies were more likely to identify quality as their state's primary policy value. The authors emphasized findings that indicated that states with a more stable political environment appeared to allow for a long-term vision of the future for PBF policies and were more likely to persist with PBF policies when compared to the states with a more disruptive and changing political environment.

Similar findings were produced by Dougherty, et al. (2012) who conducted a qualitative case study to investigate why PBF policies were discontinued in Missouri, Washington, Tennessee, and Florida. Through document analysis and interviews with higher education stakeholders including campus leaders, state legislators, governors, business leaders, researchers and consultants, the authors found that PBF policies were abandoned by state legislators largely due to direct opposition of these policies from the state's higher education sector. The study's findings indicated that leaders and practitioners within these states higher education systems demonstrated strong opposition to PBF policies and perceived that these policies were deeply flawed and ineffective due to several factors including insufficient participation and input from the public higher education sector towards the design of these policies, concerns over the appropriateness of performance metrics, steep implementation costs, and concerns over the loss of campus autonomy.

Policy Instruments

In their review of the PBF research, Dougherty and Reddy (2013) identified three distinct policy instruments by which changes in student outcomes can be made through the implementation of PBF policies: financial incentives; provision of information on state goals;

and provision of information on institutional performance. Work by Hillman, et al. (2015) and Hillman, et al. (2018) indicated that financial incentives in the form of a portion of an institution's state allocations have served as the primary policy instruments envisioned by policy makers when considering performance funding policy implementation. A smaller proportion of performance-based funding research has examined how information on state goals is shared with institutions by policymakers and if institutional leaders become more aware of state goals following the passage of PBF policies. In their investigation of the campus response to PBF policies, Ness, et al. (2015) found that campus leaders do become aware of state goals because of the implementation of PBF funding policies, however this knowledge was mostly limited to those at the top of the institutional hierarchy and not well diffused throughout the campus.

No notable research has yet to address how states employ the provision of institutional performance data as a policy instrument of performance-funding, though studies have indicated that that such policies do result in greater institutional self-awareness (Dougherty & Reddy, 2013). Work by Li (2017) reflected these findings and indicated that college administrators and faculty were aware of state goals associated with PBF policies but were unsure of and often critical of the data sources used to develop scoring systems. Research conducted by Harbour and Nagy (2005) found that adjustments made to programs and staffing were common responses made by institutional leadership designed to improve institutional performance in response to being subjected to PBF policies. Recent work by Gandara (2019) suggest that better-resourced institutions are more likely to leverage institutional data to help identify key areas for the improvement of institutional performance to secure a greater share of PBF dollars. Dougherty et al., (2016) suggests that the research on policy instruments is most limited by the lack of studies

examining how policy makers seek to increase the organizational ability of institutions to appropriately respond to performance-funding policies through capacity building efforts.

Performance Funding Effectiveness

Studies on the effectiveness of PBF policies can be organized into two broad categories: those who investigate institutional response to these policies and those who investigate the effectiveness of these policies on targeted student outcomes that typically include student retention and degree attainment rates (Ortagus, et al., 2020).

Effectiveness of Performance Funding Policies on Student Outcomes

Much of the early work on the effectiveness of PBF policies on student outcomes found that these policies often provided only small financial allocation to institutions and therefore produced weak incentives (Dougherty & Reddy, 2013; Dougherty, et al., 2014). A recent systematic synthesis of the research on PBF policies has confirmed these early findings and indicates that the adoption of such policies is “generally associated with null or modest positive on the intended outcomes of retention and graduation” (Ortagus, et al, 2020, p. 520). Quantitative studies investigating the relationship between PBF 1.0 policies and the intended student outcomes of retention and degree attainment found no relationship between these outcomes and the early policy adoption (Volkwein & Tandberg, 2008; Rutherford & Rabovsky, 2014). Volkwein and Tandberg (2008) employed a random effects regression analysis using panel data over a six-year period and determined that PBF policies did not produce increased completion rates or student preparation. Rutherford and Rabovsky (2014) conducted a qualitative

study leveraging data collected from the Integrated Postsecondary Educational Data System (IPEDS) to examine the effectiveness of state PBF policies on student outcomes. Using data from 568 public four-year institutions over an 18-year period, the study used three dependent variables: six-year graduation rates, retention rates, and bachelor's degree attainment rates to perform panel regression models and found that early PBF 1.0 policy adoption was not related to improved student outcomes.

Hillman, et al. (2014) conducted a study to investigate the relationship between PBF policy adoption among public 4-year Pennsylvania colleges and degree attainment. Using a difference-in-differences estimation strategy, the authors found limited evidence that the implementation of PBF policies produced an increase in degree attainment. However, once the findings were compared to similar institutions in other states the relationship disappeared.

Umbricht, et al. (2017) conducted a similar study employing difference-in-differences estimation with fixed effects to investigate the relationship between PBF policy adoption and degree attainment in Indiana's public universities and found no relationship between the two. Boland (2020) also employed a difference-in-differences estimation to study the relationship between PBF policy implantation and baccalaureate degree attainment rates among public 4-year Historically Black Colleges and Universities (HBCUs) and found no relation between the two.

Only two national studies provide limited evidence that the implementation of PBF policies resulted in an increase in bachelor's degree attainment rates. Tandberg and Hillman (2014) conducted a difference-in-differences estimation with fixed effects and used panel data to explore the relationship between PBF policy implementation and baccalaureate degree attainment rates during the period of 1990 to 2010. Using principle-agent theory as a conceptual framework, the study pulled state-level data from multiple datasets including IPEDs and U.S.

Department of Education's Digest of Education Statistics to create a panel dataset of 1,050 observations. Although the authors caution that the study was unable to control for the differences in the amount of state appropriations tied to performance-funding policies and was also unable to account for states with active PBF policies prior to 1990, the study found that PBF states produced slightly more baccalaureate degrees per year than the national average. The study also found that among PBF states, these policies do not have a statistically significant effect on the total number of degrees produced until the seventh year that the policy had been in effect and beyond. These findings suggest that "the longer a state operates its performance funding program the more likely it may be to increase completions" (p. 239).

Similar findings were produced by Li (2020) in a study designed to determine whether a science, technology, engineering, and mathematics (STEM) initiative included in 13 state PBF policies resulted in greater bachelor's degree attainment rates in STEM fields. Using principle-agent theory and anticipatory policy effects as a conceptual framework, the study employed a difference-in-differences analysis using panel data for 551 public four-year institutions between the period of 2003 and 2015. Findings from the study suggest that the STEM incentives as part of PBF policies were successful in both increasing the bachelor's degree attainment rates in STEM fields while also increasing the proportion of STEM degrees awarded as a proportion of all bachelor's degrees awarded. In their review of the current research on the intended outcomes of PBF policy adoption, Ortagus et al. (2020) affirm that PBF "states have not consistently improved student or institutional outcomes" after the implementation of PBF policies and note that these findings are consistent across degree types, institutional types, and state context (p. 536).

Organizational Responses to Performance Funding Policies

Existing PBF research indicates that campus leaders make institutional changes in response to the implementation of these policies in ways designed to improve their institutional rankings which are often linked to student outcomes (Dougherty et al., 2016). These organizational responses are organized in the research into four categories: adjustments in institutional expenditures; adjustments to academic programs and practices; adjustments to remedial education and academic support services; and adjustments to student services programs and practices.

Ness, et al. (2015) conducted an ethnographic case study on four of Tennessee's public higher education institutions to investigate the institutional response to the implementation of PBF policies by the Tennessee legislature. The authors conducted interviews with over 100 key campus and system actors and identified 660 campus-based completion initiatives in response to the state's PBF policies. The study concluded that the state policies served as effective policy instruments for informing campus leaders of state priorities demonstrated by "robust campus-level completion activity" but warned that the policies also produced the unintended outcomes of "reduced inter-campus collaboration" and lacked sufficient premiums for under-represented student populations (p. 4). The study recommended that campus leaders should prioritize student learning and align their strategic planning efforts with the state's PBF policies. The authors called on policymakers to better communicate state goals and identify ways to account for campus context and promote inter-campus collaboration in future policy revisions.

Similarly, Li (2017) conducted a qualitative study using the case study approach to investigate the experiences and perspectives of seven campus administrators in response to PBF

policy implementation at a single community college in Washington state. Using principle-agent theory as a framework, the study explored the views of campus leaders to better examine how institutions respond to PBF policy implementation. More specifically, the study questioned what campus leaders know and think about the state's student achievement goals and sought to identify the measures campus leaders were making on their campus to support these goals. Through semi-structured interviews the researcher captured each participant's "beliefs and opinions about the policy" and their related responses which were then triangulated with publicly available data to "corroborate, verify, and confirm data" (p. 189). The study determined that all the campus leaders included in the study were aware of the PBF policy's purpose and how it connected with their own departments, contributing to the related scholarship that such policies do inform campus leaders of state priorities and goals. However, the study also found that campus leaders were initially hesitant to buy-in to the policy and most expressed views that measuring institutional success through a scoring schema was "at best inadequate due to its simplistic nature, and at worst, abhorrent to the fundamental purpose of postsecondary education" (p. 193).

Unintended Outcomes of Performance Funding

Numerous studies have documented how the implementation of performance-funding policies may produce a range of unintended consequences. Work by Dougherty et al. (2014) and Lahr et al. (2014) found that pressures felt by campus leaders resulted in attempts to game the system and the weakening of academic rigor through the manipulation of institutional data, grade inflation, and the reduction of degree requirements. Hillman (2016) found that PBF policies can incentivize institutions to increase their selectivity of students resulting in the restriction of

access. A qualitative study by Kelchen and Stedrak (2016) using a fixed effects regression model to examine if PBF policy implementation results in institutional adjustments to the allocation of revenues, expenditures, and financial aid, found that PBF institutions received fewer Pell Grant revenues than non-PBF institutions. These findings suggest that colleges and universities may choose to enroll fewer lower-income students following PBF policy adoption.

Cornelius & Cavanaugh (2016) conducted a document analysis of public PBF documents from Florida's State University System (SUS) and found a positive correlation between how institutions performed against state metrics and the institution size. The study identified a negative correlation between institutional performance and the population of Black and disabled students. The authors highlighted how PBF funding policies tend to prioritize full-time, first-time in college (FTIC) students over part-time students which in turn, may penalize colleges and universities that cater to part-time students, such as community colleges. The authors suggest that higher education institutions may be too complex in both how they are structured and how they function for PBF funding policies to be effective and propose that such policies would better suit institutions "where performance is easily measured, tasks are simple and routine, goals are unambiguous, and employees have direct control over the production process" (p. 183). A longitudinal study conducted by Knight, et al. (2018) utilized a Chi-square contingency analysis, and produced similar findings, indicating that PBF policy adoption resulted in both a reduction of four-year degree attainment rates and a longer time to degree for students with disabilities.

Performance Funding Policies and Community Colleges

PBF policy research has questioned the fit of these policies for two-year institutions. Early work by Burke (1998) on the unintended outcomes of PBF policy adoption indicated that

the metrics commonly associated with these policies tend to hold a preference for fulltime students and suggested that such policies may harm institutions like community colleges which serve a disproportionate number of parttime students. More recent research has echoed these early findings and called on policymakers to produce more refined PBF measures that better define success at the community college level using a different lens than they use to define success at the 4-year institution level (Li, 2017). Rios-Aguilar and Deil-Amen (2019) note that “the fluid development of aspirations and exploration of future goals is a fundamental feature of such low-cost, open-access institutions, and is highly incompatible with rigid performance measures” (p. 129). The authors urge policymakers to reimagine incentive structures that better align with the comprehensive missions of community colleges and the unique needs of the students served by these institutions. Analysis of early PBF 2.0 policy implementation indicated that there was little consideration of equity in these models (Burke & Mordarresi, 2001). Dougherty, et al. (2014) noted that community college faculty, staff, and administrators commonly expressed doubt that student retention or completion rates properly measured student success in an open-access context.

Dougherty, et al. (2016) posit that for PBF policies to be effective in achieving their intended outcomes in the context of open access community colleges, they must account for the presence of at-risk students, include metrics that align well the institutional missions of these institutions, and help to expand their institutional capacity. The authors further suggest that PBF policies largely fail to recognize that community colleges “need more funding for financial aid and student services to improve their capacity to help their less prepared and low-income students succeed’ (p. 212). The authors note that current PBF policies provide a narrow definition of success and recommend that future policies aimed at community colleges include

transfer measures that recognize the transfer to a 4-year institution without first obtaining a community college degree as a measure of success. The authors suggest that metrics better aligned for the community college context would include measures that capture the progression of low income and minority students along guided academic pathways and would reward institutions for narrowing performance gaps across racial and social class lines.

Dougherty, et al. (2016) emphasize the need for policymakers to invest in institutional capacity to allow campus leaders to better understand their institutional outcomes. The authors suggest that financial incentives are not sufficient in themselves to produce lasting improvements in student outcomes. They call on policy makers to address the need to increase the capacity of community colleges for organizational learning to increase their ability to identify and address common campus data intelligence shortcomings including the capacity to collect and analyze data, implement new data management systems, hire additional institutional researchers, and train faculty and other support staff to analyze performance data more effectively. Finally, the authors recognize that community colleges need resources to help them develop solutions to performance problems including technical assistance in creating communities of practice, developing communication channels that support an ongoing dialog on how to improve student success, and recognizing how institutional values, beliefs, and structures may undermine the success of their students.

Future Research on Performance Funding

Ortagus et al. (2020) suggest that additional research is needed to better understand “the impact of variations in PBF policy design, particularly regarding which characteristics of performance-funding policies can improve institutional outcomes and reduce, rather than

exacerbate, educational inequality among students from historically underrepresented groups” (p. 543). Additionally, the authors suggest that research is needed to better understand the how PBF policies should be considered given the larger state context and how they interact with other policies aimed at increasing college access, such as dual enrollment and merit aid programs. Other studies have suggested that current PBF scholarship has investigated the impact of these policies in isolation, potentially ignoring context and the impact of other policy and institutional efforts that could be affecting college access and success (Ortagus et al., 2020; Dougherty et al., 2016).

The Florida College System’s Performance Funding Model

The 2016 Florida Legislature codified the Florida College System (FCS) Performance-Based Incentive program into s.1001.66, Florida Statutes, effective July 1, 2016 (Florida Department of Education, 2016). The law awards a performance-based incentive to Florida College System institutions using PBF measures adopted by the State Board of Education. Upon passage, the law withheld \$30 million from base state allocations to the entire Florida College System and added an additional \$30 million in new base funding to the system. The state’s initial PBF model included four measures (as described in Table 2 below): job placement/continuing education; retention rate; completion rate; and earnings. Each measure was limited to a cohort of full-time, first-time in college (FTIC) students on the Associate of Arts degree track and was weighted as follows: completion rate and retention rate: 100%; job placement/continuing education: 75%; entry-level wages: 30%. Measures were established for each institution for both excellence and improvement. Excellence measures scored individual institutions by the comparison of institutional data to the system averages from the previous year. Improvement

measures scored individual institutions by the comparison of institutional data to their own performance in prior years. Each college was scored based on either their excellence or improvement score, whichever was higher.

Table 2. FCS Performance Based Funding Model 2016-17

10 points per measure	Total points determine funding category
4 Measures: <ul style="list-style-type: none"> • Retention • Completion • Job Placement/Continuing Education • Entry Level Wages 	Highest score among improvement and excellence scores applied to an institution's ranking: <ul style="list-style-type: none"> • Improvement score compares an institution's current performance to its prior 2-year average • Excellence score compares an institution's current performance to the FCS prior 2-year average

Colleges were ranked based on their score and assigned to a category of gold, silver, bronze or purple (Florida Department of Education, 2016). As described in Table 3 below, top performing institutions were assigned to the gold category and received their base state allocations and an additional allocation which included funds taken from the base appropriations of institutions ranked bronze or purple and an additional percentage of the new base funding. Institutions ranked silver received their base state allocations and an additional percentage of the new base funding. Institutions ranked bronze received only their base state allocations while

institutions ranked purple lost a portion of their base allocations and were required to create and implement a performance improvement plan.

Table 3. The Florida College System's Performance-Based Funding Categories 2016-17

	Purple	Bronze	Silver	Gold
Base Funding	Implement Plan	Auto-Restore	Auto-Restore	Auto-Restore
(Institutional Investment)	for Restoration	Institutional Investment	Institutional Investment	Institutional Investment and Potential Redistribution from Purple
New Funding	None	None	Prorated Share	Prorated Share
(State Investment)			of State Investment	of State Investment and Redistribution from Bronze and Purple

The Florida College System’s PBF policies served as a component of a larger state-wide economic recovery effort. The economic recession of the mid-2000’s left Florida with an unemployment rate close to 12% at the peak of the crisis (Florida Department of Economic Opportunity, 2018). The Florida Department of Economic Opportunity (FDEO) was established in 2011 and given the charge to develop a plan for the state’s economic recovery. The agency

released its plan in 2018 which identified “talent supply and education” as the first of a six pillars framework (p. 16). Five strategies are included within this pillar designed to prepare the state’s population for the jobs of tomorrow by increasing the state’s postsecondary degree attainment rates. The plan predicted that “67% of the jobs created in Florida between 2018 and 2025 will require a postsecondary degree or certificate” (p. 18). Florida ranks 37 among the nation in bachelor’s degree attainment at 29.9% of its population (United States Census, 2019). As such, improving the state’s bachelor’s degree attainment rates serve as an important strategy in Florida’s overall approach to economic development.

Theoretical Framework

Principle-agent theory (Jensen & Meckling, 1976) served as the theoretical framework to guide this study. Principle-agent theory is concerned with relationship between the principle and their agents and is applicable to the relationship between states (principles) and public colleges (agents) as demonstrated in previous research on performance-funding policies (Li, 2017; Hillman et al., 2015; Pheatt et al., 2014). Originally established in the field of economics and later applied to political science, principle-agent theory posits that principles establish contractual agreements with agents which are designed to support the goals of the principle (Lane, 2007; Weimer & Vining, 2011; Dougherty, et al., 2016). Principle-agent theory recognizes that principles and agents are self-interested actors that hold separate and sometimes opposing interest which can result in agents behaving in ways that run counter to the interest of the principles (Bohren, 1998). The theory acknowledges that information asymmetry can occur between principles and agents demonstrated by agents having increased knowledge about their own capacity, activities, and behaviors than do principles (Kivistö, 2008). Principles use policy

instruments that leverage financial incentives and the provision of information to inform agents of goals and secure their compliance (Stone 2012; Dougherty, et al., 2016). Principle-agent theory is applied to the study of performance-funding to understand how states use agreements, oversight, incentives, and sanctions to align institutional activities with statewide goals (Dougherty et al., 2013; Dougherty & Reddy, 2013; Dougherty et al., 2016).

As described by Dougherty et al. (2016), PBF models are neo-liberal policy instruments designed to align the priorities of the principle with the agent by making a portion of state allocations to these institutions dependent on the performance of certain metrics. As such, the principle-agent theory will be applied to this study to describe the relationship and interactions that occur between the policymakers at the state level and actors at the institutional level of a public comprehensive community college. In this way the policymakers serve as principles and the community college serves as the agent. Through the development and implementation of Florida's PBF model, state policymakers sought to align institutional activities with state goals for higher education.

Florida's strategy for economic recovery provides context to the Florida College System's PBF policies by the identification of increased postsecondary degree attainment as an important component of the state's overall economic recovery plan. For this study, the retention rates of full-time, first-time in college (FTIC) students serve to represent the primary intended outcome of the state's PBF policies at the institutional level. This decision was made for two main reasons. First, as the Florida College System's PBF policies were first implemented during the 2016-2017 academic year, there has not been sufficient time to measure the effectiveness of these policies on completion rates. Second, one can infer from the role the Florida College

System's PBF policies serve in the state's overall economic recovery plan that retaining students on their academic pathway towards the goal of degree completion serves as a central intended outcome of the state's overall plan.

Finally, as the Florida College System's PBF policies measure the retention rate of full-time, first-time in college (FTIC) students, measuring how the retention rates and enrollment data for this specific group of students have changed along the variables of race, gender, and Pell Grant-eligibility following the implementation of these policies will provide evidence of the effectiveness of these policies. This inquiry will draw directly from the work of Kelchen and Stedrak (2016) to determine if the implementation of PBF policies spurs institutional adjustments that promote or hinder enrollment and retention among certain student demographics. This work also pulls directly from that of Rios-Aguilar & Deil-Amen (2019) by suggesting that such institutional adjustments that negatively impact underserved student populations are especially problematic for community colleges who, because of their open-access admissions policies and wide-range of academic program offerings, serve as one of the few academic pathways in higher education available for underserved students. Through this analysis, this study contributes a better understanding of how PBF policies impact community colleges and how the design of these policies support or hinder the missions of these open access institutions.

This study seeks to increase understanding of the effectiveness of PBF policies on a public open-access community college. Specifically, this study examines the following questions:

1. Are there statistically significant differences among the retention rates of White students and minority students following the implementation of PBF policies?
2. Are there statistically significant differences among the retention rates of female students and male students following the implementation of PBF policies?
3. Are there statistically significant differences among the retention rates of non-Pell Grant-eligible students and Pell Grant-eligible students following the implementation of PBF policies?
4. Are there differences among enrollment rates for race, gender, and Pell Grant eligibility at the time of enrollment following the implementation of PBF policies?

Summary

Performance-based funding (PBF) has become a popular policy tool among state legislatures seeking to align state-level priorities with public colleges and universities. Unlike early PBF 1.0 models which provided financial bonuses as incentives, PBF 2.0 policies tie a portion of an institution's state allocations to a set of metrics which commonly include student retention and degree attainment rates. Although approximately 30 states currently use PBF 2.0 policies to connect appropriations to institutional outcomes, there is little empirical evidence to suggest that these policies are successful (Umbricht, et al., 2017; Hillman, et al., 2018). Instead, a recent systematic synthesis of research exploring the intended and unintended outcomes of PBF policies by Ortagus, et al. (2020) indicates that PBF policies may instead create a range of

unintended outcomes that include a restriction of access and these policies are especially problematic for under-resourced institutions and those who primarily serve underrepresented student populations. In this way, PBF 2.0 policies are especially problematic for community colleges who have endured an erosion of state appropriations over that last two decades and, because of their open-access admissions policies, serve a disproportionate number of underrepresented students when compared to their university counterparts (Rios-Aguilar & Deil-Amen, 2019).

The Florida College System's (FCS) PBF model which was implemented in 2016 links state allocations to the retention, completion, and job placement of a cohort of full-time, first-time-in college (FTIC) students. This model is especially challenging for FCS institutions as this student profile represents a fraction of their total student body and as such, fails to fully reflect the institutional outcomes of these colleges. The FCS PBF model incentivizes institutions to prioritize the success of one group of students over all others. This research investigates the effectiveness of these PBF policies at a single FCS member institution by comparing the retention rates of full-time, FTIC students by race, gender, and Pell Grant eligibility for the four years following the implementation of these policies. This study seeks to determine if differences exist among enrollment rates for these same variables following PBF implementation. By doing so, this study explores the intended and unintended outcomes of the FCS's PBF model. This work contributes to the PBF literature by suggesting that the overall effectiveness of PBF policies is associated with how accurately they account for the specific characteristics and operating environments of the institutions they are designed to measure.

CHAPTER THREE: METHODOLOGY

Overview

This quantitative study seeks to increase understanding of the effectiveness of PBF policies on a public open-access community college. Using Jensen & Meckling's (1976) principle-agent theory, this study examines the relationship between the implementation of PBF policies and student outcomes by testing research questions designed to identify statistically significant differences among the retention rates of students along the lines of race, gender, and Pell Grant eligibility. The study also seeks to determine if differences exist among enrollment rates for these same variables. This chapter presents in detail this study's research design, population, data collection, data preparation, and statistical analysis. A summary of the methodology is provided at the end of the chapter.

Purpose Statement

The purpose of this study is to examine the impact of PBF policies on a public community college with an open-access mission following the quantitative research methodology. The study evaluates the level of success these policies had on their intended outcome of increased student retention by comparing the retention rates of full-time, FTIC students by race, gender, and Pell Grant eligibility for the four years following the implementation of these policies. This study also seeks to determine if differences exist among enrollment rates for these same variables following PBF implementation. By doing so, this study explores the intended and unintended outcomes of the Florida College System's (FCS) PBF model. This study provides a better understanding into the institutional characteristics and

environment in which these policies were applied, answering the call made by Ortagus et al. (2020) to examine the circumstances which may “confound and inform analyses of the impact of PBF adoption” to better understand the precise conditions that impact the outcomes of PBF policies (p. 543).

Research Questions

The research questions and hypotheses are designed to increase understanding of the effectiveness of PBF policies on a public open-access community college. Specifically, this study examines the following research questions:

1. Are there statistically significant differences among the retention rates of White students and minority students following the implementation of PBF policies?
2. Are there statistically significant differences among the retention rates of female students and male students following the implementation of PBF policies?
3. Are there statistically significant differences among the retention rates of non-Pell Grant-eligible students and Pell Grant-eligible students following the implementation of PBF policies?
4. Are there differences among enrollment rates for race, gender, and Pell Grant eligibility at the time of enrollment following the implementation of PBF policies?

Null and Alternative Hypotheses

For Research Question One, the null and alternative hypotheses are as follows:

H_o - The average retention rate for White students is not significantly different than the average retention rate for minority students.

H_a - The average retention rate for White students is greater than the average retention rate for minority students.

For Research Question Two, the null and alternative hypotheses are as follows:

H_o - The average retention rate for female students is not significantly different than the average retention rate for male students.

H_a - The average retention rate for female students is greater than the average retention rate for male students.

For Research Question Three, the null and alternative hypotheses are as follows:

H_o - The average retention rate for non-Pell-eligible students is not significantly different than the average retention rate for students who are receiving Pell Grant support.

H_a - The average retention rate for non-Pell-eligible students is greater than the average retention rate for students who are receiving Pell Grant support.

Research Design and Rationale

This research is focused on the effectiveness of PBF policies on student retention rates by comparing how retention rates and enrollment data for full-time, first-time in college (FTIC) students have changed over time following the implementation of these policies. This study follows a nonexperimental quantitative research methodology. Creswell (2018) suggests that a

quantitative approach be utilized when testing theories by comparing the relationship among variables. Variables denote measurable attributes or characteristics that fluctuate among a population (Creswell, 2018). Independent variables affect outcomes and are termed independent due to their freedom of other influences where dependent variables rely on the independent variables to demonstrate their influence (Creswell, 2018).

This study follows a *post-hoc* nonexperimental cross-sectional design to test Jensen & Meckling's (1976) principle-agent theory by comparing relationships among the variables of student retention rates and enrollment data for the four years following the initial implementation of PBF policies. Cross-sectional designs are utilized by researchers at one point in time to record a population of interest but do not manipulate variables (Creswell, 2018). In this way, this study employs an independent two sample t test assuming unequal variances (also known as the Aspin-Welch test, Welch's t-test, or the Satterthwaite method) to assess whether there are any statistically significant differences among the retention rates along the lines of race, gender, and Pell Grant eligibility. Ruxton (2006) notes that the independent two sample t test assuming unequal variances is the superior approach when seeking to compare the central tendency of 2 populations.

This study also explores changes among enrollment rates for these same variables during this same period. Descriptive statistics are utilized to analyze the data produced for all research questions included in this study.

Research Questions One, Two, and Three utilize an independent two sample t test assuming unequal variances to assess whether the means of the retention rates of full-time, first-time in college (FTIC) students are statistically different for the variables of race, gender, and

Pell-Grant eligibility during the four years following the implementation of PBF policies. For Research Questions One, Two, and Three the researcher used an alpha level of .05 (Donnelly & Trochim, 2005). Research Question Four utilized descriptive statistics to identify differences among enrollment rates for these same variables over the same period.

Setting

The data for this study was obtained from an open-access state college located in the southeastern United States, referred to for the purpose of this study using the pseudonym *Sunshine State College*. Sunshine State College's most recent available enrollment data was from the 2019-20 academic year and indicated an enrollment of just over 24,000 students by headcount or just above 11,000 students by full time equivalent (FTE). The focus of this study is the 8,449 students enrolled as full-time, first-time in college (FTIC) students during any of four academic years beginning with 2016-17 and ending with 2019-20 academic year.

Sunshine State College serves as a comprehensive state college and offers over 100 academic programs ranging from certificate to associate and baccalaureate degree programs. The college serves as a pathway for students interested in transferring to a four-year institution via the Associate of Arts University Transfer degree. As a Level II state college, the institution also offers twelve upper-level academic programs including a Bachelor of Applied Science in Supervision and Management, as well as seven bachelor's degrees in education, a Bachelor of Science in Engineering Technology, a Bachelor of Science in Information Technology, a Bachelor of Science in Nursing, and a Bachelor of Science in Accounting degree.

Sunshine State College maintains its regional accreditation from the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) to award associate and bachelor’s degrees and operates six campuses in its two-county service area. The college reported awarding just over 4,100 degrees and certificates during the 2019-20 academic year. The college’s student demographics are provided below in Table 4.

Table 4. Institutional Profile

	College Credit	Adult Education	Continuing Education
White	60%	31%	52%
Black	12%	15%	5%
Hispanic	17%	40%	7%
Two or more Races	3%	2%	0%
Asian	2%	5%	1%
Unknown	2%	2%	32%
Male	39%	38%	51%
Female	60%	61%	48%
Unknown/Not Reported	1%	1%	1%
Fulltime (Fall 2019)	38%		
Average Age	26	35	41

(DSC, 2021)

Population

This study was conducted at an open-access state college located in the southeastern United States, referred to for the purpose of this study using the pseudonym *Sunshine State*

College. The college's most recent available enrollment data from the 2019-20 academic year indicated an enrollment of just over 24,000 students by headcount or just above 11,000 students by full time equivalent (FTE). These students are enrolled in a range of academic programs including Adult Education, Continuing Education, Associate of Arts, Associate of Science, Bachelor of Applied Science, and Bachelor of Science.

Sample

This study employed purposive sampling. Purposive sampling comprises using the researcher's knowledge or experience to develop clear criteria to guide the selection of a sample (Lunenburg & Irby, 2008). The purposive sample involved the sampling of a larger institutional data set and included student data for students who satisfy the criteria of fulltime, first-time-in college (FTIC) entering in the fall semester during the period of four academic years beginning in fall 2016 through the spring semester of 2020.

Data Collection

Approval from the Institutional Review Board (IRB) was received before the data was obtained for use in this study. This study used a data set produced by the Institutional Research Department of Sunshine State College. The data set was designed to mimic the data set used by the Florida College System to measure the institutions PBF rankings which the state does not share directly with the institution. Secondary data analysis serves as a viable method of inquiry when systematic procedures are followed (Johnston, 2014). The data set contains aggregated and de-identified student data from four academic years beginning with 2016-17 and ending with

2019-20. This sample represents the most complete data set available at the time of this study since the initial implementation of the PBF policies occurred at the beginning of the 2016-17 academic year. The data set was created by the Sunshine State College's Institutional Research Department using data from the institution's enterprise resource management system (ERP) and consists of a cohort of students for each academic year who meet the criteria of a fulltime, first-time-in-college (FTIC) student as defined by the state.

The Florida College System measures student retention by determining which students from a single cohort enroll in two consecutive fall terms (Florida Department of Education, 2018). The cohort consists of two groups of students. The first includes first-time-in-college (FTIC), lower division students who enrolled in programs that lead to one of the following credentials: Post-Secondary Adult Vocational Certificate (PSAV)/Career and Technical Certificate (CTC), Post-Secondary Vocational Certificate (PSVC)/College Credit Certificates (CCC), Applied Technical Diploma (ATD), Apprenticeship (APPR), Advanced Technical Certificate (ATC), Associate of Arts (AA), Associate of Science (AS) and Associate of Applied Science (AAS). The second group of students includes first-time in upper division (FTUD) students who are enrolled in a program that result in a Bachelor of Science (BS) or Bachelor of Applied Science (BAS) credential.

The data set consists of student data for fulltime, first-time-in-college (FTIC) students who meet the above criteria at the start of the fall semester. Sunshine State College's Institutional Research Department determines a student's FTIC status through several measures including confirmation that the student had not previously enrolled at the institution and had not produced transfer credits from another institution. Students who may have earned credits in a lower-level

program at the institution (i.e., AA or AS) but who are enrolling for the first time in an upper-level program (i.e., BS or BAS) are considered FTIC. Students who were formerly enrolled in the institution as dual-enrolled students but are now attending college for the first time are also considered FTIC.

Sunshine State College's Institutional Research Department analyzes student data at the end of the fall semester to ensure this data set accurately reflects all fulltime, FTIC students. As this data is first pulled early in the semester, some students were initially included in the data set who never actually attended the institution during the given fall semester. Examples include students who were administratively dropped due to non-payment and students who had registered for B term courses but never attended. These students have been removed from the data set.

Reliability and Validity

The independent two sample t test assuming unequal variances has been studied thoroughly as an approach to statistical analysis and is preferable to the Student's t-test when the assumptions of equal variances and equal sample sizes are not met (Ruxton, 2006). The Type I error rate does not deviate much from the .05 value whereas the Student t-test can produce a Type I error rate over three times the .05 rate when a higher variance is associated with a smaller sample size (Ruxton, 2006). The power of the independent two sample t test assuming unequal variances is comparable to that of the Student's t-test even in instances when the population variances are equal (Ruxton, 2006). The independent two sample t test assuming unequal

variances assumes that scores related to the dependent variable are independent and normally distributed to produce a valid result (Lomax & Hahs-Vaughn, 2012).

Alignment of Research Questions to Data Sources

Table 5 provides an overview of the alignment of the study's research questions to the sources of data used for this study. As stated previously, Sunshine State College's Office of Institutional Research supplied the data set used in this study. This data set was designed to mimic the data set used by the state to develop an institution's PBF ranking.

Data Analysis

The researcher utilized IBM SPSS 27 for Windows and Mac to statistically analyze the aggregated institutional-level data collected over time from 2016 to 2020. The researcher used the independent two sample t test assuming unequal variances to answer the first three research questions of this study. This approach was chosen by the researcher as the goal of Research Questions One, Two and Three is to investigate if there is statistically significant difference in mean between two groups (Lomax & Hahs-Vaughn, 2012). The independent two sample t test assuming unequal variances is the preferred method to compare the central tendency of two populations and is superior to the Student's t-test or the Mann-Whitney U test (Ruxton, 2006). The independent two sample t test assuming unequal variances is appropriate when the population variances and the sample sizes are both unequal and assumes normal distribution (Lomax & Hahs-Vaughn, 2012). Though a Type I error is possible with the independent two sample t test assuming unequal variances, setting the level of significance to .05 can minimize

the chances of rejecting the null hypothesis when it is true (Ruxton, 2006). The results from the independent two sample t test assuming unequal variances are presented along with the mean, variance, and number of samples in each group.

Table 5. Research Questions and Data Sources

Research Question	Source of Data
1. Are there statistically significant differences among the retention rates of White students and minority students following the implementation of PBF policies?	Sunshine State College, Office of Institutional Research
2. Are there statistically significant differences among the retention rates of female students and male students following the implementation of PBF policies?	Sunshine State College, Office of Institutional Research
3. Are there statistically significant differences among the retention rates of non-Pell Grant-eligible students and Pell Grant-eligible students following the implementation of PBF policies?	Sunshine State College, Office of Institutional Research
4. Are there differences among enrollment rates for race, gender, and Pell Grant eligibility at the time of enrollment following the implementation of PBF policies?	Sunshine State College, Office of Institutional Research

The dependent variables for this study are the retention rates of full-time, first-time in college (FTIC) students by race (RQ1 & RQ4), gender (RQ2 & RQ4), and Pell-Grant eligibility (RQ3 & RQ4). The dependent variables are nominal and are categorized by “yes” equals one and

“no” equals zero. The nominal scale of measurement classifies variables into categories making all in the same category equivalent regarding the characteristic being measured (Lomax & Hahs-Vaughn, 2012). The independent variable for this study is the introduction of PBF policies that were applied to the institution where these students were enrolled, prior to their enrollment. IBM SPSS 27 for Windows and Mac was used to analyze the aggregated institutional-level data collected over time from 2016 to 2020 to answer the first three research questions of this study. As shown in Table 4 below, Research Questions One, Two and Three was answered by the analysis of both descriptive statistics and an independent two sample t test assuming unequal variances. Research Question Four was answered by the analysis of descriptive statistics for all the variables aggregated at the institutional level by year.

Table 6. Research Questions and Data Collection Items and Analysis

Research Question	Source of Data	Analysis
1. Are there statistically significant differences among the retention rates of White students and minority students following the implementation of PBF policies?	Sunshine State College, Office of Institutional Research	Descriptive statistics & Independent two sample t test assuming unequal variances
2. Are there statistically significant differences among the retention rates of female students and male students following the implementation of PBF policies?	Sunshine State College, Office of Institutional Research	Descriptive statistics & Independent two sample t test assuming unequal variances

Research Question	Source of Data	Analysis
3. Are there statistically significant differences among the retention rates of non-Pell Grant-eligible students and Pell Grant-eligible students following the implementation of PBF policies?	Sunshine State College, Office of Institutional Research	Descriptive statistics & Independent two sample t test assuming unequal variances
4. Are there differences among enrollment rates for race, gender, and Pell Grant eligibility at the time of enrollment following the implementation of PBF policies?	Sunshine State College, Office of Institutional Research	Descriptive statistics

Timeline

This study was conducted during the summer and early fall of 2021. Approval from the Institutional Review Board (IRB) was requested and approved in early summer. Once approved, data collection and analysis occurred in the summer and early fall. This study was finalized in October of 2021.

Limitations & Delimitations

There are multiple threats to validity, both internal and external, that can jeopardize a researcher's ability to determine that the independent variables have impacted the dependent variables instead of some outside factor (Creswell, 2018). Possible internal threats to validity include procedures, experiences, or treatments involved in a study that limit the researcher's capacity to extrapolate from the data (Creswell, 2018). Potential external threats to validity include the interaction of selection and treatment, interaction of setting and treatment, and the interaction of history and treatment, which can lead to the researcher drawing incorrect inferences (Creswell, 2018). In addition, inadequate statistical power can produce erroneous interpretations of the data and threaten statistical conclusion validity while improper definitions and measures of variables can threaten a study's construct validity (Creswell, 2018).

The researcher conducting this study worked to mitigate threats to validity presented by the limitations of the population and sample. The study was limited to a single public open-access community college in the Southeast United States. The study was also limited to examining the PBF outcome of student retention and therefore was unable to account for other contextual factors that can influence student retention. The study relied on aggregated data provided as an institutional dataset and the duration of the study was limited to a period of four years of institutional data.

The delimitations placed on this study by the researcher were designed to provide a deeper understanding of how the state's PBF model has impacted its targeted student cohort of fulltime, FTIC students. Towards this goal, the study only examined the retention rates of this student cohort by race, gender, and Pell Grant-eligibility for the four years following the

implementation of these policies. This study also sought to determine if differences exist among enrollment rates for these same variables following PBF implementation. As such, this study did not investigate the impact of the state's PBF model on the entire student body enrolled in a range of academic programs ranging from adult education, vocational, and baccalaureate degrees. In addition, the retention rates compared in this study are one of several success metrics embedded in the state's initial PBF model. The researcher chose to focus on the impact of the state's PBF model on student retention rates as this one measure is representative of the central purpose of this model: retaining students on their academic pathway towards the goal of degree attainment. Finally, the Florida College System (FCS) has updated its PBF model multiple times since the policy was first implemented in 2016. The latest model implemented in 2020 includes additional metrics including those that measure the number of students successfully completing gateway courses and others designed to measure the success rates of workforce programs. The researcher has chosen to not include this latest version of this policy in this study as the data regarding these outcomes is limited to a single academic year.

The results of this study are not be generalizable outside of Sunshine State College, the institution where the study was conducted, but instead serves to provide meaningful insight into how institutional characteristics such as location, size, and student populations aid or impede the intended outcomes of PBF policies. The results will help policy makers and campus leaders to better understand the intended and unintended consequences of incentive funding models and will provide meaningful insights to guide future policy considerations.

Summary

Performance-based funding (PBF) policies have become a popular choice among state legislators to align institutional outcomes to state goals. This study employed a *post-hoc* nonexperimental cross-sectional design to test Jensen & Meckling's (1976) principle-agent theory by comparing relationships among the variables of student retention rates and enrollment data for the four years following the initial implementation of PBF policies. This study employed an independent two sample t test assuming unequal variances (also known as the Aspin-Welch test, Welch's t-test, or the Satterthwaite method) to assess whether there are any statistically significant differences among the retention rates along the lines of race, gender, and Pell Grant-eligibility. This study provides a better understanding into the institutional characteristics and environment in which these policies were applied, answering the call made by Ortagus et al. (2020) to examine the circumstances which may "confound and inform analyses of the impact of PBF adoption" to better understand the precise conditions that impact the outcomes of PBF policies (p. 543).

CHAPTER FOUR: FINDINGS

Introduction

This quantitative *post-hoc* nonexperimental cross-sectional study sought to increase the understanding of the effectiveness of PBF policies on a public open-access community college. Using Jensen & Meckling's (1976) principle-agent theory, this study examined the relationship between the implementation of PBF policies and student outcomes by testing research questions designed to identify statistically significant differences among the retention rates of students along the lines of race, gender, and Pell Grant eligibility. The study also sought to determine if differences exist among enrollment rates for these same variables. This chapter presents in detail this study's findings. This chapter begins with the sampling and data collection procedures used in the study followed by a review of the study's demographics and sample statistics. Finally, a summary of the results from the statistical analysis of student retention and enrollment data are provided at the end of this chapter.

Sampling and Data Collection Procedures

This quantitative study was conducted at an open-access state college located in the southeastern United States, referred to for the purpose of this study using the pseudonym *Sunshine State College*. Sunshine State College's most recent available enrollment data from the 2019-20 academic year showed an enrollment of 24,071 students by headcount or 11,043.5 students by full time equivalent (FTE). Sunshine State College is a public open-access higher education institution, that offers a range of academic programs including Adult Education, College Credit (Associate of Arts, Associate of Science, Bachelor of Applied Science, and

Bachelor of Science), and Continuing Education. Table 5 provides ten years of Sunshine State College’s historical student enrollment data by program beginning with the 2010-11 academic year through the 2019-20 academic year.

Table 7. Sunshine State College - Enrollment Data by Program 2010-2020

<i>Ac. Year</i>	<i>Adult Ed.</i>	<i>College Cr.</i>	<i>Cont. Ed.</i>	<i>Totals</i>
2010/11	8996	25283	3455	36334
2011/12	5722	22905	3300	30999
2012/13	4333	21267	3746	28547
2013/14	3822	20736	4043	27693
2014/15	3666	20135	4559	27492
2015/16	3325	20306	4203	27179
2016/17	3393	20314	3089	26217
2017/18	2962	20418	3293	26045
2018/19	2273	19815	3370	24963
2019/20	1763	20023	2821	24071

This quantitative study utilized purposive sampling, a sampling approach that relied on the researcher’s knowledge and experience to establish clear criteria to guide the selection of a sample (Lunenburg & Irby, 2008). The purposive sample included de-identified student data for all students entering in the fall semester and enrolled during four academic years beginning in fall 2016 through the spring semester of 2020 who satisfied the criteria of fulltime, first-time-in college (FTIC). The criteria of fulltime, first-time-in-college (FTIC) students was established as

an element of the study's sample design as it replicates the criteria used by the Florida College System to measure student retention.

Sampling Demographics and Descriptive Statistics

The sample for this study was collected by Sunshine State College's Institutional Research Department using enrollment data from the institution's enterprise resource management system (ERP). The ERP collects student data beginning with the initial admission and enrollment processes including data that indicate how a student self-identifies regarding their race, ethnicity, and gender. The ERP also collects data on students who apply for financial aid through the Free Application for Federal Student Aid (FASFA) which identify students who are Pell Grant Eligible. This study's sample was comprised of 8,449 fulltime, first-time-in-college (FTIC) students who were enrolled at the start of the fall semester in either in a lower-level or upper division program that culminate with a Bachelor of Science (BS) or Bachelor of Applied Science (BAS) credential. This sample represents the most complete data set available at the time of this study since the initial implementation of the PBF policies occurred at the beginning of the 2016-17 academic year.

For this study, a student satisfied the criteria of FTIC status if it was determined that the student had not previously enrolled at the institution and had not produced transfer credits from another institution. Students who had previously earned credits in a lower-level program at the institution (i.e., AA or AS) but enrolled for the first time in an upper-level program (i.e., BS or BAS) were identified as FTIC. Similarly, students who were formerly enrolled as dual-enrolled students but were then enrolled in college for the first time were also considered FTIC and

included in the sample. Students initially included, but who never actually attended the institution during the fall semester were removed from the sample.

The Florida College System's PBF model during the period of this study measured student retention by determining which students from a single cohort entering in a fall semester enrolled in the subsequent fall term (Florida Department of Education, 2018). As such, this study calculated the retention rates for the sample by identifying the number of students entering as member of a fall cohort who enrolled in the subsequent fall semester across the dependent variables of race, gender, and Pell Grant eligibility. In terms race, students were identified as minority students if they self-identified as American Indian/Alaska Native, Asian, Black/African American, Hispanic/Latino, Native Hawaiian/Other Pacific Islander, and Two or More Races). Pell Grant eligibility was determined by the numbers of students who applied to receive financial aid and were determined to be Pell Grant-eligible. Students who had not applied for financial aid were identified as non-Pell Grant-eligible. For both Race/Ethnicity and gender, students who chose Prefer Not to Answer or who did not respond were excluded from the sample.

Validity and Reliability

The quality of a research study is dependent on the reliability of the instrument used which is demonstrated by the consistency of an instrument (Creswell, 2018). As indicated in the previous chapter, the independent two sample t test assuming unequal variances is well-established as a reliable approach to statistical analysis and is the preferred instrument over the Student's t-test when the assumptions of equal variances and equal sample sizes are not met (Ruxton, 2006). The independent two sample t test assuming unequal variances Type I error rate

deviates very little from the .05 value whereas the Type I error rate produced by the Student t-test can result at a rate over three times the .05 rate when a higher variance is associated with a smaller sample size (Ruxton, 2006). The power of the independent two sample t test assuming unequal variances is similar to that of the Student's t-test even where the population variances are equal (Ruxton, 2006). The independent two sample t test assuming unequal variances relies on the assumptions that scores related to the dependent variable are independent and normally distributed to produce a valid result (Lomax & Hahs-Vaughn, 2012). The central limit theorem (CLT) states that the distribution of a sample means will be normally distributed in cases where the sample size is sufficiently large ($n > 30$). Therefore, this study's sample size of 8,449 fulltime, first-time-in-college (FTIC) students exceeds the central limit theorem's $n > 30$ requirement and satisfies the assumption of normal distribution. The sample used in this study also satisfies the assumption of independence as each subject belongs to only one of four cohorts. There are no relationships between the observations for each cohort, therefore satisfying the assumption of independence.

Data Analyses and Results

This study was guided by four research questions, each with corresponding hypotheses, which led the analysis of descriptive statistics along with the results of a series of independent two sample t tests assuming unequal variances. In all, twelve independent two sample t tests assuming unequal variances were administered for this study. The first four independent two sample t tests assuming unequal variances analyzed retention rates among White students and minority students across four academic years beginning with the fall 2016 cohort and ending with the fall 2019 cohort. An independent two sample t test assuming unequal variances was

conducted for each academic year for these two groups of students. Descriptive statistics were also analyzed for each academic year for these two groups of students.

The next four independent two sample t tests assuming unequal variances analyzed retention rates among male students and female students across four academic years beginning with the fall 2016 cohort and ending with the fall 2019 cohort. An independent two sample t test assuming unequal variances was conducted for each academic year for these two groups of students. Descriptive statistics were also analyzed for each academic year for these two groups of students. The final four independent two sample t tests assuming unequal variances analyzed retention rates among students who were Pell Grant-eligible and non-Pell Grant eligible students across four academic years beginning with the fall 2016 cohort and ending with the fall 2019 cohort. An independent two sample t test assuming unequal variances was conducted for each academic year for these two groups of students. Descriptive statistics were also analyzed for each academic year for these two groups of students. Finally, descriptive statistics were analyzed to determine if there were differences among enrollment rates for race, gender, and Pell Grant-eligibility for each academic year, beginning with the fall 2016 cohort and ending with the fall 2019 cohort. Table 6 provides the retention rates of the sample.

Research Question One

Research Question One sought to determine if there were statistically significant differences among the retention rates of White students and minority students following the implementation of PBF policies.

Table 8. Descriptive Statistics - Retention Rates of Sample

	<i>FA16</i>	<i>FA17</i>	<i>FA18</i>	<i>FA19</i>	<i>M</i>
All F/T, FTIC	55.75%	54.2%	56.58%	55.96%	55.62%
<i>Race/Ethnicity</i>					
White	61.41%	57.02%	57.9%	58.23%	58.64%
Minorities	48.31%	50.3%	54.36%	52.54%	51.36%
<i>Gender</i>					
Female	57.97%	56.59%	58.52%	58.56%	57.91%
Male	53.59%	52.25%	53.62%	52.60%	53.01%
<i>Pell Status</i>					
Non-Pell Eligible	55.33%	53.62%	57.72%	48.69%	53.84%
Pell Recipient	56.14%	54.90%	55.48%	66.75%	58.32%

For Research Question One, the null and alternative hypotheses are as follows:

H_0 - The average retention rate for white students is not significantly different than the average retention rate for minority students.

H_a - The average retention rate for white students is greater than the average retention rate for minority students.

An independent two sample t test assuming unequal variances was conducted for each academic year for these two groups of students.

Table 9. Descriptive Statistics - Research Question One (Fall 2016)

<i>Race</i>	<i>N</i>	<i>M</i>	<i>SD</i>
White	1353	0.61	0.49
Minority	952	0.48	0.50

For the fall 2016 cohort, the retention rate of White students was compared to the retention rates of minority students. The level of significance was set at .05. The results of the two-sample t test assuming unequal variances indicated a statistically significant difference between the two values, $t = 6.260$, $df = 2013$, $p < .001$. The sample mean for White students ($M = 0.61$, $SD = 0.49$) was statistically different from the sample mean for minority students ($M = 0.48$, $SD = 0.50$). On average, the retention rate for White students was greater than the retention rate for minority students.

Table 10. Descriptive Statistics - Research Question One (Fall 2017)

<i>Race</i>	<i>N</i>	<i>M</i>	<i>SD</i>
White	1403	0.57	0.50
Minority	968	0.50	0.50

For the fall 2017 cohort the retention rate of White students was compared to the retention rates of minority students. The level of significance was set at .05. The results of the two-sample t test assuming unequal variances indicated a statistically significant difference between the two values, $t = 3.224$, $df = 2065$, $p < .001$. The sample mean for White students ($M = 0.57$, $SD = 0.50$) was statistically different from the sample mean for minority students ($M =$

0.50, SD = 0.50). On average, the retention rate for White students was greater than the retention rate for minority students.

Table 11. Descriptive Statistics - Research Question One (Fall 2018)

<i>Race</i>	<i>N</i>	<i>M</i>	<i>SD</i>
White	1062	0.58	0.49
Minority	968	0.54	0.50

For the fall 2018 cohort the retention rate of White students was compared to the retention rates of minority students. The level of significance was set at .05. The results of the two-sample t test assuming unequal variances indicated no statistically significant difference between the two values, $t = 1.505$, $df = 1642$, $p = .066$. The sample mean for White students ($M = 0.58$, $SD = 0.49$) was not statistically different from the sample mean for minority students ($M = 0.54$, $SD = 0.50$). On average, the retention rate for white students was not statistically different than the retention rate for minority students.

Table 12. Descriptive Statistics - Research Question One (Fall 2019)

<i>Race</i>	<i>N</i>	<i>M</i>	<i>SD</i>
White	1051	0.58	0.49
Minority	786	0.53	0.50

For the fall 2019 cohort, the retention rate of White students was compared to the retention rates of minority students. The level of significance was set at .05. The results of the two-sample t test assuming unequal variances indicated a statistically significant difference

between the two values, $t = 2.318$, $df = 1680$, $p = .010$. The sample mean for White students ($M = 0.58$, $SD = 0.49$) was statistically different from the sample mean for minority students ($M = 0.53$, $SD = 0.50$). On average, the retention rate for White students was greater than the retention rate for minority students.

Research Question Two

Research Question Two sought to determine if there were statistically significant differences among the retention rates of female students and male students following the implementation of PBF policies.

For Research Question One, the null and alternative hypotheses are as follows:

H_0 - The average retention rate for female students is not significantly different than the average retention rate for male students.

H_a - The average retention rate for female students is greater than the average retention rate for male students.

An independent two sample t test assuming unequal variances was conducted for each academic year for these two groups of students.

Table 13. Descriptive Statistics - Research Question Two (Fall 2016)

<i>Gender</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Female	1254	0.58	0.49
Male	1071	0.54	0.50

For the fall 2016 cohort, the retention rate of female students was compared to the retention rates of male students. The level of significance was set at .05. The results of the two-sample t test assuming unequal variances indicated a statistically significant difference between the two values, $t = 2.120$, $df = 2259$, $p = .017$. The sample mean for female students ($M = 0.58$, $SD = 0.49$) was statistically different from the sample mean for male students ($M = 0.54$, $SD = 0.50$). On average, the retention rate for female students was greater than the retention rate for male students.

Table 14. Descriptive Statistics - Research Question Two (Fall 2017)

<i>Gender</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Female	1380	0.57	0.50
Male	997	0.52	0.50

For the fall 2017 cohort, the retention rate of female students was compared to the retention rates of male students. The level of significance was set at .05. The results of the two-sample t test assuming unequal variances indicated a statistically significant difference between the two values, $t = 2.100$, $df = 2136$, $p = .018$. The sample mean for female students ($M = 0.57$, $SD = 0.50$) was statistically different from the sample mean for male students ($M = 0.52$, $SD = 0.50$). On average, the retention rate for female students was greater than the retention rate for male students.

Table 15. Descriptive Statistics - Research Question Two (Fall 2018)

<i>Gender</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Female	1102	0.59	0.49
Male	744	0.54	0.50

For the fall 2018 cohort, the retention rate of female students was compared to the retention rates of male students. The level of significance was set at .05. The results of the two-sample t test assuming unequal variances indicated a statistically significant difference between the two values, $t = 2.080$, $df = 1581$, $p = .019$. The sample mean for female students ($M = 0.59$, $SD = 0.49$) was statistically different from the sample mean for male students ($M = 0.54$, $SD = 0.50$). On average, the retention rate for female students was greater than the retention rate for male students.

Table 16. Descriptive Statistics - Research Question Two (Fall 2019)

<i>Gender</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Female	743	0.67	0.49
Male	1111	0.49	0.50

For the fall 2019 cohort, the retention rate of female students was compared to the retention rates of male students. The level of significance was set at .05. The results of the two-sample t test assuming unequal variances indicated a statistically significant difference between the two values, $t = 7.890$, $df = 1653$, $p = p < .001$. The sample mean for female students ($M = 0.67$, $SD = 0.49$) was statistically different from the sample mean for male students ($M = 0.49$,

SD = 0.50). On average, the retention rate for female students was greater than the retention rate for male students.

Research Question Three

Research Question Three sought to determine if there were statistically significant differences among the retention rates of non-Pell Grant-eligible students and Pell Grant-eligible students following the implementation of PBF policies.

For Research Question Three, the null and alternative hypotheses are as follows:

H_0 - The average retention rate for non-Pell-eligible students is not significantly different than the average retention rate for students who are receiving Pell Grant support.

H_a - The average retention rate for non-Pell-eligible students is greater than the average retention rate for students who are receiving Pell Grant support.

An independent two sample t test assuming unequal variances was conducted for each academic year for these two groups of students.

Table 17. Descriptive Statistics - Research Question Three (Fall 2016)

<i>Pell Status</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Non-Pell-eligible	1135	0.55	0.50
Pell-eligible	1204	0.56	0.50

For the fall 2016 cohort, the retention rates of non-Pell Grant-eligible students were compared to the retention rates of Pell Grant-eligible students. The level of significance was set

at .05. The results of the two-sample t test assuming unequal variances indicated no statistically significant difference between the two values, $t = 0.400$, $df = 2328$, $p = .350$. The sample mean for non-Pell Grant-eligible students ($M = 0.55$, $SD = 0.50$) was not statistically different from the sample mean for Pell Grant-eligible students ($M = 0.56$, $SD = 0.50$). On average, the retention rate for non-Pell Grant-eligible students was not statistically different than the retention rate for Pell Grant-eligible students.

Table 18. Descriptive Statistics - Research Question Three (Fall 2017)

<i>Pell Status</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Non-Pell-eligible	1324	0.54	0.50
Pell-eligible	1080	0.55	0.50

For the fall 2017 cohort, the retention rate of non-Pell Grant-eligible students was compared to the retention rates of Pell Grant-eligible students. The level of significance was set at .05. The results of the two-sample t test assuming unequal variances indicated no statistically significant difference between the two values, $t = 0.630$, $df = 2308$, $p = .265$. The sample mean for non-Pell Grant-eligible students ($M = 0.54$, $SD = 0.50$) was not statistically different from the sample mean for Pell Grant-eligible students ($M = 0.55$, $SD = 0.50$). On average, the retention rate for non-Pell Grant-eligible students was not statistically different than the retention rate for Pell Grant-eligible students.

Table 19. Descriptive Statistics - Research Question Three (Fall 2018)

<i>Pell Status</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Non-Pell-eligible	913	0.58	0.50
Pell-eligible	939	0.55	0.50

For the fall 2018 cohort, the retention rate of non-Pell Grant-eligible students was compared to the retention rates of Pell Grant-eligible students. The level of significance was set at .05. The results of the two-sample t test assuming unequal variances indicated no statistically significant difference between the two values, $t = 0.971$, $df = 1849$, $p = .166$. The sample mean for non-Pell Grant-eligible students ($M = 0.58$, $SD = 0.50$) was not statistically different from the sample mean for Pell Grant-eligible students ($M = 0.55$, $SD = 0.50$). On average, the retention rate for non-Pell Grant-eligible students was not statistically different than the retention rate for Pell Grant-eligible students.

Table 20. Descriptive Statistics - Research Question Three (Fall 2019)

<i>Pell Status</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Non-Pell-eligible	1111	0.49	0.50
Pell-eligible	743	0.67	0.47

For the fall 2019 cohort, the retention rate of non-Pell Grant-eligible students was compared to the retention rates of Pell Grant-eligible students. The level of significance was set at .05. The results of the two-sample t test assuming unequal variances indicated a statistically significant difference between the two values, $t = 7.890$, $df = 1653$, $p < .001$. The sample mean for non-Pell Grant-eligible students ($M = 0.49$, $SD = 0.50$) was statistically different from the

sample mean for Pell Grant-eligible students ($M = 0.67$, $SD = 0.47$). On average, the retention rate for Pell Grant-eligible students was greater than the retention rate for non-Pell Grant-eligible students.

Research Question Four

Research Question Four sought to determine if there were differences among enrollment rates for race, gender, and Pell Grant-eligibility following the implementation of PBF policies. This research question was answered through the analysis of the descriptive statistics of the sample. Table 7 provides the enrollment rates for the sample over the four academic years included in the study.

The enrollment rates for fulltime, FTIC students dropped from 2339 students entering in fall semester of 2016 to 1854 students entering in the fall semester of 2019. This change indicates a decline of 485 students or a 20.74% drop in enrollment between fall 2016 and fall 2019. Though a decline in student enrolment rates is reflected throughout the sample along the variables of race, gender, and Pell Grant-eligibility, the rates of decline are not distributed equally across these variables over these four academic years. The enrollment rates for White students within the sample dropped from 1353 students entering in fall semester of 2016 to 1051 students entering in the fall semester of 2019, an overall decline of 302 students, indicating a 22.32% drop in enrollment. Comparatively, the enrollment rates for minority students within the sample dropped from 952 students entering in fall semester of 2016 to 786 students entering in the fall semester of 2019, an overall decline of 166 students, indicating a 17.44% drop in enrollment.

Table 21. Descriptive Statistics - Enrollment Rates of Sample

	FA16	FA17	FA18	FA19	Totals
<i>Race/Ethnicity</i>					
White	1353 (57.8%)	1403 (58.4%)	1062 (57.3%)	1051 (56.7%)	4869
Minorities	952 (40.7%)	968 (40.3%)	767 (41.4%)	786 (42.4%)	3473
Unknown	34 (1.5%)	33 (1.4%)	23 (1.2%)	17 (0.9%)	107
<i>Gender</i>					
Female	1254 (53.6%)	1380 (57.4%)	1102 (59.5%)	1033 (55.7%)	4769
Male	1071 (45.8%)	997 (41.5%)	744 (40.2%)	768 (41.4%)	3580
Unknown	14 (0.6%)	27 (1.1%)	6 (0.3%)	53 (2.9%)	100
<i>Pell Status</i>					
Non-Pell Eligible	1135 (48.5%)	1324 (55.1%)	913 (49.3%)	1111 (59.9%)	4483
Pell Recipient	1204 (51.5%)	1080 (44.9%)	939 (50.7%)	743 (40.1%)	3966
Total	2339	2404	1852	1854	8449

The enrollment rates for female students within the sample dropped from 1254 students entering in fall semester of 2016 to 1033 students entering in the fall semester of 2019, an overall decline of 221 students, indicating a 17.62% drop in enrollment. Comparatively, the enrollment rates for male students within the sample dropped from 1071 students entering in fall semester of 2016 to 768 students entering in the fall semester of 2019, an overall decline of 303 students, indicating a 28.29% drop in enrollment. The enrollment rates for non-Pell Grant-eligible students within the sample dropped from 1135 students entering in fall semester of 2016 to 1111 students entering in the fall semester of 2019, an overall decline of 24 students, indicating a 2.11% drop in enrollment. Comparatively, the enrollment rates for Pell Grant-eligible students within the

sample dropped from 1204 students entering in fall semester of 2016 to 743 students entering in the fall semester of 2019, an overall decline of 461 students, indicating a 38.29% drop in enrollment.

The largest overall decline in enrollment between the fall semester of 2016 and the fall semester of 2019 was demonstrated by Pell Grant-eligible students with a difference of 461 students, indicating a 38.29% decline in enrollment. Male students demonstrated the next largest decline in enrollment over this same period with a loss of 303 students, indicating a 28.29% decline in enrollment. The least overall decline in enrollment between the fall semester of 2016 and the fall semester of 2019 was demonstrated by non-Pell Grant-eligible students with an overall difference of 24 students, indicating a 2.11% decline in enrollment. Minority students demonstrated the next smallest decline in enrollment over the same period with a loss of 166 students, indicating a 17.44% decline in enrollment.

Summary

This chapter presented in detail this study's findings beginning with the sampling and data collection procedures used and followed by a review of the study's demographics and sample statistics. Finally, a summary of the results from the statistical analysis of student retention and enrollment data were provided. Results related to the research questions revealed that in most cases there were statistically significant differences among the retention rates across the variables of race, gender, and Pell Grant-eligibility for the sample of fulltime FTIC students across four academic years beginning with the fall 2016 cohort through the fall 2019 cohort.

For Research Question One, the results of the independent two sample t test assuming unequal variances indicated that on average, the retention rate for White students was greater than the retention rate for minority students for students entering in the fall cohorts of 2016, 2017 and 2019. Conversely, results of the independent two sample t test assuming unequal variances indicated that on average, the retention rate for White students not statistically different than the retention rate for minority students for students entering in the fall 2018 semester. For Research Question Two, the results of the independent two sample t test assuming unequal variances indicated that on average, the retention rate for female students was greater than the retention rate for male students for students entering in the fall cohorts of 2016, 2017, 2018, and 2019.

For Research Question Three, the results of the independent two sample t test assuming unequal variances indicated that on average, the retention rates for non-Pell Grant-eligible students were not statistically different than the retention rate for Pell Grant-eligible students entering in the fall cohorts of 2016, 2017 and 2018. However, results of the independent two sample t test assuming unequal variances indicated that on average, the retention rate for Pell Grant-eligible students was greater than the retention rate for non-Pell Grant-eligible students for students entering in the fall 2019 semester. For Research Question Four, the results of the analysis of descriptive statistics indicated that the enrollment rates for the sample of fulltime, FTIC students declined by 20.74% fall 2016 and fall 2019. The decline in student enrolment rates was reflected throughout the sample along the variables of race, gender, and Pell Grant-eligibility over these four academic years. The largest overall declines in enrollment were demonstrated by Pell Grant-eligible students with a 38.29% decline in enrollment, and male students who demonstrated a 28.29% decline in enrollment.

Chapter five follows this chapter and will provide the researcher's interpretations of the findings for this study and recommendations for future research. The chapter will provide a summary of the study, including a synopsis of the problem, the purpose statement, problem statement, research questions, a review of the study's methodology, and the major findings. A discussion of the findings as it relates to the relevant literature will also be provided. Chapter five will conclude with a summary of the implications for these findings, recommendations for future research, and final remarks.

CHAPTER FIVE: DISCUSSION

Introduction

This quantitative *post-hoc* nonexperimental cross-sectional study sought to increase the understanding of the effectiveness of PBF policies on a public open-access community college. Using Jensen & Meckling's (1976) principle-agent theory, this study examined the relationship between the implementation of PBF policies and student outcomes by testing research questions designed to identify statistically significant differences among the retention rates of students along the lines of race, gender, and Pell Grant eligibility. The study also sought to determine if differences exist among enrollment rates for these same variables. This chapter presents in detail this study's findings. This chapter begins with a summary of the study including a review of the problem and purpose statements, the research questions, methodology, and the findings. A discussion of the findings as they relate to the relevant literature is also included. This chapter concludes with recommendations for future research, implications for action, and final remarks.

Summary of the Study

The study examined the intended and unintended outcomes of the Florida College System's (FCS) performance-based funding (PBF) model by investigating the impact of this policy on student retention rates at a single FCS member institution. Following a quantitative methodological approach, the study compared the retention rates of full-time, FTIC students by race, gender, and Pell Grant eligibility for the four years following the implementation of these policies while examining if differences exist among enrollment rates for these same variables following PBF implementation. This work contributes to the PBF literature by suggesting that

the overall effectiveness of PBF policies is associated with how accurately they account for the specific characteristics and operating environments of the institutions they are designed to measure.

Problem Statement

Policymakers at the state and federal levels have placed increased pressure on the higher education sector to produce highly skilled workers to support the overall productivity of the American workforce. However, state appropriations to higher education institutions have eroded over the last decade and have not yet recovered from losses realized during the Great Recession (Mitchel et al., 2014). Many state legislatures across several states have introduced performance-based funding (PBF) measures that tie a portion of an institution's state allocations to institutional outcomes that commonly include student retention, completion, and job placement rates to increase accountability in higher education and support economic expansion. As a result, many higher education institutions now face increased accountability while also experiencing historically low state appropriation levels.

A recent synthesis of PBF scholarship suggests that the adoption of PBF policies has been associated with null or modest positive impacts on these policy's intended outcomes of student retention and graduation rates (Ortagus, et al., 2020) Instead, PBF policies have often produced unintended outcomes that have included the restriction of access, the gaming of PBF systems, and have particularly disadvantaged underrepresented student populations and less-resourced institution types (Gandara & Rutherford, 2017). PBF policies have been found to be particularly problematic for open-access community colleges, and have effectively turned the open-access policies of these institutions into a disadvantage (Rios-Aguilar & Deil-Amen, 2019).

The Florida College System's (FCS) PBF model implemented in 2016 presented a challenge for Florida's community colleges by limiting its success metrics to a cohort of fulltime, FTIC students, a student population that represents just a fraction of most of these institutions' overall student enrollments. This approach incentivized institutions to prioritize the success of one student group over all others and failed to measure the full range of institutional outcomes produced by these colleges. This misalignment can lead community colleges to focus limited institutional resources in ways that maximize PBF metrics. In doing so, institutions may reduce resources in other areas not directly measured by PBF which may produce unintended negative outcomes (Dougherty, et al., 2016; Hillman, 2016). If policymakers are to continue to rely on PBF policies to communicate state-level goals with community colleges, these policies should be designed in ways that are better aligned with and support the full missions of these institutions (Dougherty, et al., 2016; Li, 2017).

Theoretical Framework

Principle-agent theory (Jensen & Meckling, 1976) served as the theoretical framework which guided this study. Principle-agent theory is concerned with relationship between the principle and their agents and is applicable to the relationship between states (principles) and public colleges (agents) as demonstrated in previous research on performance-funding policies (Li, 2017; Hillman et al., 2015; Pheatt et al., 2014). Originally established in the field of economics and later applied to political science, principle-agent theory posits that principles establish contractual agreements with agents which are designed to support the goals of the principle (Lane, 2007; Weimer & Vining, 2011; Dougherty, et al., 2016). Principle-agent theory recognizes that principles and agents are self-interested actors that hold separate and sometimes

opposing interests which can result in agents behaving in ways that run counter to the interests of the principles (Bohren, 1998). The theory acknowledges that information asymmetry can occur between principles and agents demonstrated by agents having increased knowledge about their own capacity, activities, and behaviors than do principles (Kivistö, 2008). Principles use policy instruments that leverage financial incentives and the provision of information to inform agents of goals and secure their compliance (Stone 2012; Dougherty, et al., 2016). Principle-agent theory is applied to the study of performance-funding to understand how state legislatures use agreements, oversight, incentives, and sanctions to align institutional activities with statewide goals (Dougherty et al., 2013; Dougherty & Reddy, 2013; Dougherty et al., 2016).

As described by Dougherty, et al. (2016), performance funding models are a neo-liberal policy instruments designed to align the priorities of the principle with the agent by making a portion of state allocations for these institutions dependent on the performance of certain metrics. As such, the principle-agent theory was applied to this study to describe the relationship and interactions that occur between the policymakers at the state level and at the institutional level of a public comprehensive community college of which falls under the oversight of the policymakers. In this way the policymakers serve as principles and the community college serves as the agent. Through the development and implementation of the state's performance funding model, state policymakers sought to align institutional activities with state goals for higher education.

Purpose Statement

The purpose of this study is to examine the impact of performance-based funding (PBF) policies on a public community college with an open-access mission following the quantitative research methodology. The study examines the level of success these policies have had on their intended outcome of increased student retention by comparing the retention rates of full-time, first-time-in-college (FTIC) students by race, gender, and Pell Grant eligibility for the four years following the implementation of these policies. This study also seeks to determine if differences exist among enrollment rates for these same variables following PBF policy implementation. By doing so, this study explores the intended and unintended outcomes of the FCS's PBF model. Finally, this study contributes to the PBF literature by providing a better understanding into the institutional characteristics and environment in which these policies were applied, answering the call made by Ortagus et al. (2020) to examine the circumstances which may “confound and inform analyses of the impact of PBF adoption” to better understand the precise conditions that impact the outcomes of PBF policies (p. 543).

Sampling and Data Collection Procedures

This quantitative study was conducted at an open-access state college located in the southeastern United States, referred to for the purpose of this study using the pseudonym *Sunshine State College*. Sunshine State College's most recent available enrollment data from the 2019-20 academic year showed an enrollment of 24,071 students by headcount or 11,043.5 students by full time equivalent (FTE). Sunshine State College is a public open-access higher education institution, that offers a range of academic programs including Adult Education,

College Credit (Associate of Arts, Associate of Science, Bachelor of Applied Science, and Bachelor of Science), and Continuing Education.

The sample for this study was collected by Sunshine State College's Institutional Research Department using enrollment data from the institution's enterprise resource planning system (ERP). The ERP collects student data beginning with the initial admission and enrollment processes and includes data that indicates how a student self-identifies regarding their race, ethnicity, and gender. The ERP also collects data on students who apply for financial aid through the Free Application for Federal Student Aid (FASFA) which identifies students who are Pell Grant Eligible. This study's sample was comprised of 8,449 fulltime, first-time-in-college (FTIC) students who were enrolled at the start of the fall semester in either in a lower-level or upper division program that culminate with a Bachelor of Science (BS) or Bachelor of Applied Science (BAS) credential. This sample represents the most complete data set available at the time of this study since the initial implementation of the PBF policies occurred at the beginning of the 2016-17 academic year.

Discussion of Findings

As described the previous chapter and illustrated in Table 20, the analysis of the student retention data following the implementation of PBF policies revealed mixed findings. Among the sample of fulltime, FTIC students across four academic years beginning with the fall 2016 cohort through the fall 2019 cohort, findings indicate on average, there were statistically significant differences among the retention rates of students across the variables of race, gender, and Pell Grant-eligibility. However, these findings were not consistent for all variables or

cohorts. For Research Question One the results of the independent two sample t test assuming unequal variances indicated the retention rates for White students were significantly greater than the retention rates of minority students for three of the four cohorts included in the sample. The fall 2018 cohort was the exception to these findings as the results of the independent two sample t test assuming unequal variances indicated that on average for this cohort, the retention rate for White students was not statistically different than the retention rates of minority students. Therefore, for Research Question One the null hypothesis was rejected for the 2016, 2017, and 2019 cohorts, but not rejected for the 2018 cohort.

Table 22. Summary of Independent Two Sample T Test Assuming Unequal Variances

	<i>FA16</i>	<i>FA17</i>	<i>FA18</i>	<i>FA19</i>
<i>RQ#1 Race/Ethnicity</i>				
White / Minority	✓	✓	X	✓
<i>RQ#2 Gender</i>				
Female / Male	✓	✓	✓	✓
<i>RQ#3 Pell Status</i>				
Non-Pell / Pell	X	X	X	✓

Key: ✓ = Significant; X = Not Significant

For Research Question Two, the results of the independent two sample t test assuming unequal variances indicated that on average, the retention rate for female students was greater than the retention rate for male students for all four cohorts included in the sample. Therefore, for Research Question Two the findings were consistent, and the null hypothesis was rejected.

Table 23. Summary - Changes in Enrollment Rates

	<i>FA16</i>	<i>FA17</i>	<i>FA18</i>	<i>FA19</i>
<i>Race/Ethnicity</i>				
White	1353	1403	1062	1051
% Change Prev. Year		3.7%	-24.31%	-1.04%
% Change Since 2016			-21.51%	-22.32%
Minorities	952	968	767	786
% Change Prev. Year		1.68%	-20.76%	2.48%
% Change Since 2016			-19.43%	-17.44%
<i>Gender</i>				
Female	1254	1380	1102	1033
% Change Prev. Year		10.05%	-20.14%	-6.26%
% Change Since 2016			-12.12%	-17.62%
Male	1071	997	744	768
% Change Prev. Year		-6.91%	-25.38%	3.23%
% Change Since 2016			-30.53%	-28.29%
<i>Pell Status</i>				
Non-Pell Eligible	1135	1324	913	1111
% Change Prev. Year		16.65%	-31.04%	21.69%
% Change Since 2016			-19.56%	-2.11%
Pell Recipient	1204	1080	939	743
% Change Prev. Year		-10.30%	-13.06%	-20.87%
% Change Since 2016			-22.01%	-38.29%

For Research Question Three, the results of the independent two sample t test assuming unequal variances indicated that on average, the retention rates for non-Pell Grant-eligible students were not statistically different than the retention rate for Pell Grant-eligible students for the first three of the four cohorts included in the sample. The fall 2019 cohort was the exception to these findings as the results of the independent two sample t test assuming unequal variances indicated that on average for this cohort, the retention rate for Pell Grant-eligible students were significantly greater than the retention rates of non-Pell Grant-eligible students. Therefore, for Research Question Three the null hypothesis was not rejected for all four cohorts included in the sample. Analysis of the student retention data revealed that the retention rates for White students and female students were both significantly greater than the retention rates of minority students and male students by the fourth year following the implementation of PBF policies. An important caveat to these results is that the 2019 cohort findings indicated that on average, the retention rate of Pell-eligible students was statistically significantly greater than the retention rate of non-Pell eligible students.

For Research Question Four, the results of the analysis of descriptive statistics indicated that the enrollment rates for the sample of fulltime, FTIC students declined overall by 20.74% between fall 2016 and fall 2019. The decline in student enrolment rates was reflected throughout the sample along all the variables of race, gender, and Pell Grant-eligibility over these four academic years. The largest overall declines in enrollment were demonstrated by Pell Grant-eligible students with a 38.29% decline in enrollment, male students who demonstrated a 28.29% decline in enrollment, and White students with an overall 22.32% decline in enrollment. Across the variables of race, gender and Pell Grant-eligibility, the greatest declines in enrollment from the previous year occurred during the 2018 cohort, with the lone exception of Pell Grant-eligible

students whose greatest decline in enrollment from the previous year occurred in the fall 2019 cohort.

Findings Related to the Literature

This study contributed to the existing body of research on the effectiveness of PBF policies by investigating the effectiveness of the Florida College System's (FCS) PBF policies at a single, public, open-access, FCS member institution through the comparison of student retention and enrollment rates of fulltime, FTIC students by race, gender, and Pell Grant eligibility following the implementation of PBF policies. This study's findings generally reflect the larger body of research on the effectiveness of PBF policies which indicates that PBF policies produce null or modest effects on their primary targeted institutional outcomes of increased student retention and degree attainment rates (Dougherty, et al., 2016; Ortagus, et al, 2020). As illustrated in Table 6 (page 66), the overall retention rate of the sample increased slightly during the first four years of PBF policy implementation, from 55.75% in fall 2016 to 55.96% in fall 2019.

The findings of this study indicate that following the implementation of PBF policies, the enrollment rates of White students, female students, and non-Pell Grant-eligible students were significantly greater than those of minority students, male students, and Pell Grant-eligible students. These findings are consistent with current PBF scholarship also suggests that PBF policies often produce unintended consequences that disproportionately impact underrepresented student populations including minority and low-income students (Dougherty, et al., 2016; Hillman, 2016; Kelchen & Stedrak, 2016; McKinney & Hagedorn, 2017). Research by Jones et al. (2017) suggests that PBF policies may create equity issues within public open-access

colleges, complicated by limited resources which impede the ability for these institutions to serve all students, regardless of their socio-economic status and academic preparedness. As noted by Baine and Baum (2016) the comprehensive missions of open access community colleges complicate the measurement of student success. Research by Dougherty, et al (2016) recognized that differences in the missions and structures of community colleges and universities present unique obstacles to the effective institutional responses and implementation of PBF policies.

Work by Birdsall (2018) and Umbricht et al. (2017) has shown a correlation between PBF policy implementation and the restriction of access for student populations that are less likely to be successful academically, including minority and low-income students. This study reflects these earlier studies demonstrated by results that indicated that by the fourth year of PBF policy implementation, White students and female students had on average significantly greater retention rates than their underrepresented peers. However, regarding Pell Grant-eligibility, the findings from the study show that the enrollment rates for Pell Grant-eligible students and male students declined over the four-year period at a higher rate than all the other groups included in the sample and also indicate that the retention rates of Pell Grant-eligible students were significantly greater than their non-Pell Grant-eligible peers. These findings may suggest that the decline in enrollment of Pell Grant-eligible students following the implementation of PBF policies may have resulted in a positive impact on the retention rates of this underrepresented student population. This study's findings broadly suggest that the FCS's PBF policies were not effective in accurately accounting for the specific characteristics and operating environments of the institutions they are designed to measure.

Limitations

The study was limited to a single public open-access community college in the Southeast United States. Although findings from the study indicate that White students and female students had on average significantly greater retention and enrollment rates than their underrepresented peers, these results are unable to isolate the impact of PBF policy implementation on institutional outcomes from other institutional and system-level changes which occurred at the same time. With analysis limited to only the examination of the retention rates of the sample by race, gender, and Pell Grant-eligibility for the four years following the implementation of PBF policies, the study sought to determine if differences exist among enrollment rates for these same variables following PBF implementation. As such, the study did not investigate the impact of the state's PBF model on the entire student body enrolled in a range of academic programs ranging from adult education, vocational, and baccalaureate degrees. In addition, the retention rates compared in this study are one of several success metrics embedded in the state's initial PBF model. The researcher chose to focus on the impact of the state's PBF model on student retention rates as this one measure is representative of the central purpose of this model: retaining students on their academic pathway towards the goal of degree attainment. Finally, the Florida College System has updated its PBF model multiple times since the policy was first implemented in 2016. The latest model implemented in 2020 includes additional metrics including those that measure the number of students successfully completing gateway courses and others designed to measure the success rates of workforce programs. The researcher has chosen to not include this latest version of this policy in this study as the data regarding these outcomes is limited to a single academic year.

The results of this study are not be generalizable outside of Sunshine State College, the institution where the study was conducted, but instead serves to provide meaningful insight into how institutional characteristics such as location, size, and student populations aid or impede the intended outcomes of PBF policies. The results will help policy makers and campus leaders to better understand the intended and unintended consequences of incentive funding models and will provide meaningful insights to guide future policy considerations.

Recommendations for Future Research

The Florida College System implemented significant changes to its PBF model during the 2020-21 fiscal year. The most recent version available at the time of this study has been revised to more closely reflect earlier PBF 1.0 models and allocates funds to FCS institutions from an incentive fund determined by total points earned for each PBF metric based on the number of students that satisfy the associated measure. The new metrics are organized into two groups: 2 + 2 Student Success and College Work Florida (Florida Senate, 2019).

Four distinct measures are included under 2 + 2 Student Success. Measure One includes the number of critical year-one course completions calculated by the number of dual enrolled high school students and FTIC AA Degree students which successfully pass ENC1101: English Composition I and those that successfully complete any of several gateway mathematics courses including MAC1105: College Algebra, MGF2106: Survey in Mathematics, MGF2107: Mathematics for Liberal Arts, and STA2023: Elementary Statistics. Measure Two includes first year to second year persistence calculated by the number of FTIC AA Degree students entering in the fall semester that are found to be retained, demonstrated by their enrollment in either the fall, spring, or summer semester of the subsequent academic year. Measure Two also includes

the number of students retained in the same cohort who have completed at least 24 credits with a grade of C or better by either the fall, spring, or summer semester of the subsequent academic year. Measure Three includes on-time graduation rates, calculated by the number of AA Degree graduates who complete within 150% or 200% of calendar time. For Measure Three, incentive funding is calculated using whichever metric is greater. Measure Four includes transfer rates to bachelor programs, calculated by the number of AA Degree graduates found enrolled in a bachelor's degree program within one year of completing their AA Degree.

Two distinct measures are included under College Work Florida. Measure One includes on-time completion calculated by the number of Workforce Education graduates who complete within 150% or 200% of calendar time. For Measure One, incentive funding is calculated using whichever metric is greater. Measure Two includes the number of Workforce Education graduates found continuing their education or employed within one year of graduation with wages equal or greater than the state's High Skill/High Wage entry level threshold for the corresponding Workforce Development Region or those not found to be continuing their education or employed who have completed programs linked to occupations on the Statewide or Regional Demand Occupational Lists and were found to be employed at any wage level within one year of graduation.

The changes made to the Florida College System's latest PBF model more closely reflect the comprehensive mission of Florida's open-access community colleges than the initial PBF model (described in detail on page 36). These changes are in line with recommendations made by Dougherty, et al. (2016) for policy makers to develop PBF models that better address the differences in student body composition, align better with specific institutional missions, and provide incentive funding rather than tie a portion of an institution's regular state allocations to

its institutional outcomes. However, as noted by Ortagus et al. (2020), very little remains understood about how variations in the design of PBF policies impact institutional outcomes. This is especially relevant regarding the impact of PBF design on underserved and less academically prepared student populations. Additional research that links policy design with equity outcomes would serve to guide policymakers in developing PBF models that not only consider institutional type but also the unique student composition served by each institution.

Though the results of this study suggest that the Florida College System's PBF policies were not successful in increasing the student retention rates in the four years following the implementation of these policies, this study was not able to isolate the impact of PBF policy implementation from other institutional and system-level changes which occurred during the same period. As such, additional research is needed to better understand the institutional-level factors that impact student retention and degree production at public, open-access community colleges. Additional insight is needed regarding how college leadership perceive and respond to PBF policy implementation and how institutional resources are allocated to align with PBF policy goals and outcomes. Finally, additional research is also needed to better understand the factors that resulted in the retention rates of Pell Grant-eligible students being significantly greater than their non-Pell Grant-eligible peers in the fourth year following the implementation of PBF policies.

Implications and Summary

Findings from this study highlight the challenges associated with PBF policy implementation for public, open-access community colleges. As noted by Rios-Aguilar and Deil-Amen (2019), PBF policies are particularly problematic for community colleges who, because

of their open-access admissions policies and wide-range of academic program offerings, serve as one of the few academic pathways in higher education available to underrepresented and underserved student populations. Florida's policy makers should respond to equity concerns by designing their PBF policies in ways that encourage the state's public open access institutions to provide support for all students and not focus their recruitment, enrollment, or support efforts on already advantaged student populations. PBF scholars have recognized successful models in several states that include equity metrics that reward the retention and completion of underrepresented student populations (Dougherty et al., 2016; Li, 2017; Kelchen, 2018).

Concerns regarding the disproportionate negative unintended outcomes for underrepresented students should not be interpreted as simply a moral imperative. The Florida College Access Network (2021) reports that as of 2019, 42.2% of all Floridians had earned a two-year college degree or higher. The per capita rate is higher for White Floridians at 46.1% and 30.8% for Black Floridians. The Florida College Access Network also notes that by the year 2030 Florida's population is expected to be majority minority with the White population of the state accounting for less than half of the population. Florida College System's PBF policies serve as component of a larger state-wide economic recovery and expansion effort. As such, Florida's changing demographic composition and double-digit degree attainment gaps among the state's White and Black populations should provide sufficient evidence to that state's policy makers that designing PBF policies that take into account intuitional characteristics and equity outcomes is an economic imperative.

The most recent changes made to the Florida College System's PBF model serve as a positive sign that the Florida Legislature has learned important lessons in policy design since it

initially implemented its PBF model in 2016. These recent changes provide some evidence that the Florida College System's PBF policy design is headed in the right direction. However, among the limited research that indicates PBF policy implementation may result in modest increases in degree production, work by Tandberg and Hillman (2014) suggests that such increases don't occur until after the seventh year of policy implementation. This work also suggests that modifications to the PBF metrics following policy implementation may delay any gains in the intended outcomes of these policies. As such, Florida's Legislature should resist the urge to modify the Florida College System's existing PBF model for a minimum of seven years to allow sufficient time for institutional response and for the analysis of the impact on institutional outcomes to occur.

Conclusion

The study's findings indicate that the implementation of PBF policies produced null or modest effects on their primary targeted institutional outcomes of increased student retention and degree attainment rates while producing unintended consequences that disproportionately impacted underrepresented student populations including minority and low-income students. The results of this study may be used by policymakers to design PBF policies that better align with the complex and comprehensive missions of open access community colleges.

APPENDIX: IRB APPROVAL LETTER



UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board

FWA00000351
IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

NOT HUMAN RESEARCH DETERMINATION

July 7, 2021

Dear [John Brady](#):

On 7/7/2021, the IRB reviewed the following protocol:

Type of Review:	Initial Study
Title of Study:	An Analysis of Performance-Based Funding Policies on Open Access Institutions
Investigator:	John Brady
IRB ID:	STUDY00003258
Funding:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none"> • HRP-251- FORM - Faculty Advisor Scientific-Scholarly Review BRADY .pdf, Category: Faculty Research Approval; • HRP-250-FORM- Request for NHR .docx, Category: IRB Protocol; • Variables IRB BRADY .docx, Category: Other;

The IRB determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations.

IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are research involving human in which the organization is engaged, please submit a new request to the IRB for a determination. You can create a modification by clicking **Create Modification / CR** within the study.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,



UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board

FWA00000351
IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

A handwritten signature in black ink, appearing to read "Racine Jacques".

Racine Jacques, Ph.D.
Designated Reviewer

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