



University of Kentucky  
UKnowledge

---

MPA/MPP/MPFM Capstone Projects

James W. Martin School of Public Policy and  
Administration

---

2021

## Examining the Impact of Performance-based Funding Equity Premiums on Public Historically Black Colleges and Universities

Adam Blevins  
University of Kentucky, [adam.blevins@uky.edu](mailto:adam.blevins@uky.edu)

Follow this and additional works at: [https://uknowledge.uky.edu/mpampp\\_etds](https://uknowledge.uky.edu/mpampp_etds)



Part of the [Public Affairs, Public Policy and Public Administration Commons](#)

[Right click to open a feedback form in a new tab to let us know how this document benefits you.](#)

---

### Recommended Citation

Blevins, Adam, "Examining the Impact of Performance-based Funding Equity Premiums on Public Historically Black Colleges and Universities" (2021). *MPA/MPP/MPFM Capstone Projects*. 355.  
[https://uknowledge.uky.edu/mpampp\\_etds/355](https://uknowledge.uky.edu/mpampp_etds/355)

This Graduate Capstone Project is brought to you for free and open access by the James W. Martin School of Public Policy and Administration at UKnowledge. It has been accepted for inclusion in MPA/MPP/MPFM Capstone Projects by an authorized administrator of UKnowledge. For more information, please contact [UKnowledge@lsv.uky.edu](mailto:UKnowledge@lsv.uky.edu).

**Examining the Impact of Performance-based Funding Equity Premiums on Public  
Historically Black Colleges & Universities**

Adam Blevins

University of Kentucky

Martin School of Public Policy & Administration

Spring 2021

Faculty Advisor:

Dr. Cory Curl

## **Table of Contents**

<b>Abstract</b> .....	3
<b>Introduction</b> .....	4
<b>Theoretical Framework</b> .....	7
<b>Literature Review</b> .....	9
<b>Data &amp; Methodology</b> .....	12
<b>Findings</b> .....	20
<b>Discussion and Conclusions</b> .....	26
<b>Limitations &amp; Future Study</b> .....	29
<b>Citations</b> .....	31

## Abstract

Performance-based funding (PBF) policies in the United States have grown both in complexity and popularity over the last two decades. While states seek to utilize these models to enforce accountability at institutions of postsecondary education, the rise of such funding policies has not come without scrutiny. Researchers have found evidence of adverse consequences resulting from these policies, many of which disproportionately impact underrepresented groups of students, smaller schools, and minority-serving institutions (MSIs) such as Historically Black Colleges and Universities (HBCUs). While opponents of the policies have, in some cases, called for the abandonment of PBF models altogether, proponents have sought alterations to the models to mitigate these consequences. Amongst corrective solutions, the inclusion of PBF equity premiums has been the most consistent form of revision. These premiums function by providing financial incentives through their allocation models that are intended to mitigate harm done to targeted stakeholders. This study seeks to answer a central research question: *Do PBF premiums have any effect on public 4-year HBCUs, as measured by graduation rates, retention rates, and state apportionment?* To answer this, the study employs a quasi-experimental difference-in-differences model with panel data ranging from 2007-2019, as well as year and institution fixed effects. Findings indicate that minority premiums, on average, are correlated with lower state apportionment, while adult student premiums, on average, are correlated with slight increases in apportionment. This study concludes that PBF premiums may be insufficient for bolstering student success and improving institutional resources at public HBCUs compared to their non-premium counterparts. Thus, states wishing to correct for the adverse consequences of PBF models should consider alternative or additional venues.

## **Introduction**

### ***PBF Models & Premiums***

Over the last several decades, state policymakers throughout the United States have turned to Performance-Based Funding (PBF) models as a method of enforcing accountability at institutions of higher education. While PBF models vary in complexity and application from state to state, they generally function by tying a portion of state funding for higher education to state-prescribed performance metrics. The public institutions specified under such models are then, in theory, held accountable for producing the specified desired outcomes. Desired outcomes here typically include metrics such as graduation rates and credit hour completion.

PBF models have grown in popularity with state governments across the United States. As of 2020, 41 states have implemented a PBF model at some point in time (Ortagus, Kelchen, Rosinger, & Voorhees, 2020). Though the proliferation of these funding models over the last 40 years is striking, this popularity has not come without criticism. While there has been limited evidence speaking to the efficacy of PBF models to produce their desired results, there is a substantial body of work highlighting a myriad of unintended adverse consequences of their implementation. Some examples of consequences include increased selectivity at public schools (“creaming”) and decreased funding for smaller, low-capacity schools (Hillman & Corral, 2018; Birdsall, 2018; Gandara & Rutherford, 2018; Umbricht, Fernandez, & Ortagus, 2017; Dougherty, et al., 2016; Kelchen & Stedrak, 2016). Importantly, many of these adverse consequences have been argued to disproportionately impact traditionally underserved students, such as minority students, adult students, low-income students, and GED holders, as students from these groups tend to provide fewer PBF dollars, in aggregate, for their institutions. While this is a vital acknowledgement pertaining to students identifying in these groups, it is also a key

insight when considering minority-serving institutions (MSIs), such as Historically Black Colleges and Universities (HBCUs).

Although some critics have voiced a desire to eliminate PBF models due to insufficient evidence of success and their recognized consequences, those proponents of PBF models that recognize these effects have sought remedies. Of the recommended solutions, one kind has grown both in popularity and use: equity premiums. PBF equity premiums are incorporated into PBF models and serve to provide additional funds or points over the standard amount for successful student outcomes or enrollment across students in specified groups. Typically, these groups are low-income students, minority students, or adult students. For example, Tennessee's 2015-2020 PBF formula included adult student (age 25+) and low-income student (Pell-eligible) premiums. This model provided an 80% premium for students identifying in one of the groups, and a 100% premium for students falling into both categories. What this means is that a student identified in either of the groups would garner 1.8-2 funding points for meeting model metrics compared to the standard rate of 1 point for students not identified in any target group.

### *HBCUs*

HBCUs are institutions originally established to provide educational opportunities for Black Americans. Though desegregation in the 1960s began expanding these opportunities, HBCUs still educate high proportions of at-risk and minority students. There are currently 101 HBCUs remaining in the U.S. Of these, approximately half are private institutions. As a 2017 Pew Research Center article indicates, HBCUs educate approximately 9% of the total Black population attending degree-granting institutions (Anderson, 2017). Substantially, Enrollment trends at HBCUs have grown in diversity. As of 2018, approximately a quarter of HBCU enrollment was from non-black students (U.S. Department of Education). While graduation rates

at HBCUs are substantially lower than at other universities at 30% compared to the national average of 59%, this is due primarily to the larger demographic of low-income students that these institutions serve (Boland, 2020). Even so, HBCUs graduate high proportions of Black students, especially with regard to graduate and doctoral degrees. For the 2017-2018 academic year, HBCUs awarded 11% of the total doctoral degrees earned by Black students (U.S. Department of Education). Though segregation was legally terminated in 1964, HBCUs still provide value for the communities that they serve. Even beyond the statistics, research on the institutions has indicated that HBCUs provide significant cultural benefits that improve students' sense of belonging and connectedness (Gasman & Palmer, 2008; Hirt, Strayhorn, Amelink, & Bennett, 2006).

While HBCUs still play a pivotal role in providing education and social mobility, especially to Black and low-income students, many of these institutions struggle today. Even with a myriad of legal cases advocating for equitable funding for these institutions, some research suggests that funding inequities for HBCUs are persistent (Boland, 2020). HBCUs rely more heavily on federal, state, and local funding dollars than their non-HBCU counterparts, with these funds making up 54% and 38% of revenue sources respectively. HBCUs have also seen a large decline in federal funding dollars over the last two decades, with a 42% reduction between 2003 and 2015 (American Council on Education, 2019). Recent reports have also shown that HBCUs have high fiscal fragility, with 1 in 10 of the institutions being placed on the Department of Education's heightened cash monitoring list, which increases the scrutiny placed upon these institutions for their accounting practices and makes it more difficult for them to receive federal student aid dollars (Price, 2020).

Given this context, HBCUs have a lot to gain and lose depending upon state funding models. If PBF models do exacerbate funding disparities across institutions, then HBCUs would be particularly impacted. On the other hand, if PBF premiums serve to mitigate some of these disparities while bolstering resources to promote student success, then HBCUs, as well as other MSIs, stand to see real benefits from these policies. This project seeks to examine the impact of performance-based funding equity premiums on public four-year HBCUs throughout the United States. To accomplish this, it will utilize a quasi-experimental difference-in-differences model with panel data ranging from 2007-2019. Ultimately, this will involve the comparison of two groups over time: HBCUs in states utilizing PBF premiums (the treatment group) and HBCUs in states not utilizing PBF premiums, but still utilizing a PBF model (the control group). This study hopes to control for both institution- and year-fixed effects which is made possible through the creation of a panel data set. Using this analytical framework, this paper seeks to answer one key research question: *Do PBF premiums have any effect on public 4-year HBCUs, as measured by graduation rates, retention rates, and state apportionment?*

The null hypothesis for this study is that PBF premiums will have no impact on graduation rates, retention rates, and state apportionment at public 4-year HBCUs when compared to institutions in non-premium PBF states. The alternative hypothesis is that the policy does have an impact on these measures. If premiums function to correct for adverse effects of PBF models, then we would anticipate these metrics to be higher relative to their non-premium counterparts.

## **Theoretical Framework**

This paper will utilize resource dependence theory (RDT) as a conceptual framework to understand how institutions of higher education respond to changes in the allocation of



resources. Succinctly, RDT states that institutions comply with the requests of those controlling their resources. Thus, the entity controlling resources, such as state governments, can leverage their position and economic uncertainty to compel institutions to abide by a given policy (Verbruggen, Christiaens, & Milis, 2011). RDT argues that as the level of institutional dependence on a provider increases, the more likely that institution will be to adhere to prescribed requirements. Generally, this is because RDT emphasizes institutional competition for limited resources as a key driver of action; institutions will alter behavior in order to maintain a standard of resources when resources are limited and competition is present (Boland, 2020).

In the context of higher education and PBF policies, this theory generally posits that public institutions of higher education will work to fulfill state performance metrics as state appropriations comprise a large portion of institutional funding. Because institutions are more likely to respond to state policies when they are more reliant on state funding for their operations, schools such as HBCUs are more likely to adapt to state policies given the heavy reliance on state appropriations. HBCUs and similar MSIs tend to rely more on state funding given the fiscal challenges associated with specifically serving students from lower socioeconomic statuses (Boland & Gasman, 2014; Gasman, 2010).

Applying RDT to PBF policies and their impact on HBCUs, it could reasonably be argued that HBCUs would be some of the most responsive institutions to the policy implementation. However, certain features, such as institutional capacity and persistent funding inequities, may limit the ability of HBCUs and other small postsecondary schools to meet PBF metrics. Worse, failure to meet such metrics may further exacerbate funding disparities (Hillman

& Corral, 2018). It is for this reason that PBF premiums are particularly important to HBCUs. Generally, PBF premiums have three main functions:

1. to incentivize institutions to bolster academic success in target populations;
2. to address the issue of “creaming,” or increasing selectivity at public colleges and universities in response to PBF measures;
3. and to mitigate funding losses for some institutions, particularly those with high populations of at-risk students, that result from PBF implementation (Gandara & Rutherford, 2018).

Given this context, this paper seeks to examine whether or not PBF premiums fulfill their intended purpose at HBCUs. It is particularly important to examine this group of institutions not only because they serve a disproportionately large share of many target populations, but also because they are institutions with a greater potential to see state appropriation loss as the result of PBF policies. Thus, this study seeks to directly address functions one and three outlined above as they directly pertain to HBCUs and other MSIs.

## **Literature Review**

Overall, research on PBF has yet to provide any definitive insight on the topic. Research can broadly be classified as providing mixed evidence of the policy’s efficacy, but many studies have shown little to no improvement (Boland, 2020; Umbricht, Fernandez, & Ortagus, 2017; Hillman, Tandberg, & Gross, 2014; Rutherford & Rabovsky, 2014; Tandberg, Hillman, & Barakat, 2014; Sanford & Hunter, 2011; Shin, 2010; Volkwein & Tandberg, 2008). Additionally, studies finding any graduation outcome improvement because of PBF tend to indicate that it is only for short-term degrees and certificates (Li & Kennedy, 2018; Tandberg, Hillman, &

Barakat, 2014). Most studies demonstrating PBF metric improvements examine a specific type of model classified as “PBF 2.0.” These models differ from their predecessor “1.0” models by integrating performance-based funding equations into the budget apportionment itself, rather than as a bonus fund for meeting performance objectives. To this end, these researchers argue that PBF models providing stronger incentives, such as the 2.0 models, are more effective in providing the desired results (Dougherty & Natow, 2015; Rutherford & Rabovsky, 2014).

There is a body of literature regarding the unintended impacts of PBF and equity that is vital to this study. This literature suggests that PBF may adversely impact MSIs like HBCUs by exacerbating resource gaps (Hillman & Corral, 2018). Key here are two considerations: institutional capacity and institutional selectivity. Regarding capacity, many argue that smaller institutions like HBCUs lack the resources necessary to improve on PBF objectives and metrics, thus leading them to lose even more funding through apportionment (Hillman & Corral, 2018; Jones, 2014). This is further illuminated in a 2017 study by McKinney and Hagedorn that found that some underrepresented students at community colleges in Texas brought in less PBF than other schools in the state (McKinney & Hagedorn, 2017). On a similar note, some researchers have suggested that PBF not only benefits more selective institutions as they tend to enroll lower-risk students (Hagood, 2019; Jones, et al., 2017; Kelchen, 2017), but that it may incentivize other institutions to be more selective in their recruitment and admissions (Birdsall, 2018; Umbricht, Fernandez, & Ortagus, 2017; Dougherty, et al., 2016; Kelchen & Stedrak, 2016).

Taken collectively, the literature suggests that PBF models have the potential to exacerbate the achievement gaps that already exist throughout the American educational system. These policies pose an additional concern with the topic of access given that attendance costs

and selectivity may disproportionately impact underprivileged groups. Certainly, more recent iterations of PBF policies include equity measures, such as premiums. Still, researchers have not yet thoroughly explored the impact of these equity components, with only a handful of studies finding limited, but somewhat positive, results (Kelchen, 2019; Gandara & Rutherford, 2018).

Finally, a recent publication by Ortagus, Kelchen, Rosinger, and Voorhees synthesized research on the topic as of 2020 (Ortagus, Kelchen, and Rosinger, 2020). This publication not only describes the research on the topic delineated by intended and unintended impacts, but it also provides a roadmap to the future of research. The authors argue that future research should take a more nuanced approach to quantitative modelling, noting that PBF policies vary widely across states. While a nuanced approach would be ideal, the lack of consistent reporting at the state level makes this a particularly challenging task. However, more consistent implementation trends in the future may improve the feasibility of such a project.

This study seeks to contribute to the research on PBF policies by investigating equity premiums and their implications on public HBCUs, a relatively under-studied type of institution in the literature surrounding PBF. Though this study may not incorporate the “nuance” that some recent researchers have called for, it hopes to build a stronger basis for our understanding of equity premiums and their efficacy. By utilizing public HBCUs as the primary level of analysis, this study seeks to expand on current literature and provide timely insight as these institutions are struggling to maintain fiscal solvency.

## **Data & Methodology**

### ***Data & Sampling***

Data included in this study were obtained primarily from NCES's Integrated Postsecondary Education Data System (IPEDS), the State Higher Education Executive Officers Association's (SHEEO) State Higher Education Finance platform (SHEF), the U.S. Census Bureau, the Bureau of Labor Statistics (BLS), and the Bureau of Economic Analysis (BEA). From these sources, all institution-level data was obtained from IPEDS and SHEF, while state-level control variables, such as GDP per capita and unemployment rates, were obtained from the remaining sources. All financial data utilized in this data set was adjusted for inflation utilizing the Consumer Price Index in 2019 dollars. Given that private and for-profit institutions are fundamentally different in their revenue structures and are not directly held to PBF policies, they were omitted from the sample. Additionally, 2-year institutions were omitted given both the small quantity captured in the state selection and the fundamental differences in between short- and long-term degree programs. Kentucky was omitted from the sample due to the hold harmless provision of the model which and other provisions which largely removes HBCUs from the effects of the PBF model. The University of the District of Columbia was also excluded from this sample given the inability to locate consistent details regarding higher education funding model.

Sampling for this study had several limiting factors which resulted in a final number of 11 states, 21 institutions, and 273 observations in total. Though determining dates for full policy implementation is difficult, decisions were based primarily upon the work of previous research concerning PBF policies and their associated premiums (Gandara & Rutherford, 2018; Boland

2020; Dougherty & Reddy, 2013; Tandberg & Hillman, 2014). States selected are included below in table 1. This table was adapted from Gandara and Rutherford's 2018 study on PBF premiums and their effects on student enrollment (Gandara & Rutherford, 2018). While most of the selection remained consistent, beginning and ending dates were further refined by examining legislative records and the National Conference of State Legislators' (NCSL) interactive PBF database. The range of years selected for this sample coincide with what previous research has determined to be the cutoff point between PBF 1.0 models and PBF 2.0 models (Boland, 2020; Gandara and Rutherford, 2018; Hillman, Tandberg, & Gross, 2014). Factors dictating the final sample included:

- The presence of at least 1 public, 4-year HBCU.
- The presence of any PBF policy applied to 4-year HBCUs.
- The presence of any PBF policy between 2007 and 2019.
- The PBF model must incorporate PBF metrics to core funding, not just additional funds.

**Table 1: State Sample Selection**

State	PBF Years	Any Premium	Minority Premium	Low Income Premium	Adult Student Premium	Number of Institutions
Arkansas	2011-2017	.	.	.	.	1
Florida	2013-2019	2013-2019	.	2013-2019	.	1
Louisiana	2010-2019	2016-2019	.	2016-2019	.	3
Mississippi	2014-2020	2014-2019	.	2014-2019	2014-2020	3
Missouri	2013-2019	2018-2019	.	2018-2019	.	2
North Carolina	1999-2019	.	.	.	.	5
Ohio	1997-2019	2012-2019	2012-2019	2012-2019	2012-2019	1
Oklahoma	1999-2019	2012-2019	.	2012-2019	.	1
Pennsylvania	2000-2019	2012-2014	2012-2014	2012-2014	.	1
Tennessee	1976-2019	2011-2019	1993-1996	2011-2019	2011-2019	1
Virginia	2005-2019	2005-2019	2005-2019	2005-2019	.	2

*(Adapted from Gandara & Rutherford, 2018).*

Variables selected for this study were selected in alignment with PBF premiums in mind. The three outcome variables, retention rates, graduation rates, and institutional apportionment from the state, serve to examine the purpose behind PBF premiums. Thus, the goal of this study is to examine the impact that PBF premiums have on student success, here specified by graduation rates and retention rates, as well as state funding for public HBCUs as captured in state apportionment. As previous studies argue, utilizing the natural log of variables in a DiD model is helpful both to account for differences in enrollment size across institutions (Boland, 2020), and to meet the parallel trends assumption of utilizing a difference-in-differences analysis (Boland, 2020; Gandara & Rutherford, 2018; Hillman, Tandberg, & Gross, 2014). Thus, this study will take the log of all measures used, with the exception of percentages and dichotomous variables.

It is important to note that, given the use of three outcome variables, some variation in the modeling is necessary to appropriately examine each variable. In the case of retention rate and graduation rates, variables selected were derived from previous research (Boland, 2020; Hillman, Tandberg, & Gross, 2014). Given the similarity in controls applied to graduation rates and retention rates in previous literature, the models used here are consistent across each regression. However, the model utilized to examine state apportionment features several additional variables included in studies related to state apportionment and funding (Zhao, 2018; Zhang, 2009; Rizzo & Ehrenberg, 2004). These additional variables include the outcome variables of the other models, as well as other state- and institution-level demographic features determined to be pertinent to the model. Consistent across the models is the inclusion of a variable for the length of implementation for each state's PBF model, a dichotomous variable required for the DiD analysis, and state-level factors that may contribute to institutional behavior, including Real GDP

per capita, poverty rate (150%), and unemployment rates. Table 2 below provides a comprehensive list of variables included in each model.

As a final note relating to the variable selection for these statistical models, some researchers have questioned the use of graduation rates as an accurate measure of student success at institutions such as HBCUs (Boland, 2020; Boland & Gasman, 2014). This is because HBCUs and similar institutions tend to have lower full-time enrollment rates. In order to account for this, the statistical models implemented here includes a control variable for the percentage of part-time enrollment at each institution. Ultimately, this study approaches graduation rates as the key outcome metric of four-year institutions. Compared to other studies, this model emphasizes Pell Grant aid over other forms of financial aid as most students attending public HBCUs demonstrate higher levels of financial need. Aside from these revisions, the models included for graduation and retention rates largely reflect variables captured in recent work regarding graduation rates at HBCUs (Boland, 2020).



**Table 2: Full List of Variables Included in Statistical Models**

Graduation & Retention Rates (Outcome)	State Apportionment (Outcome)
Academic support expenses per FTE (GASB)	Academic support expenses per FTE (GASB)
Allocation to Higher Educaiton (Percentage)	Any premiums offered? (dichotomous interaction variable)
Any premiums offered? (dichotomous interaction variable)	Average amount of Pell grant aid awarded to full-time first-time undergraduates
Average amount of Pell grant aid awarded to full-time first-time undergraduates	Duration of any premium
Duration of any premium	Full-time retention rate
In-state average tuition price	Graduation rate - Bachelor degree within 6 years
Percent of full-time first-time undergraduates awarded Pell grants	In-state average tuition price
Percentage of non-white enrollment	Out-of-state average tuition price
Percentage of part time enrollment	Percent of full-time first-time undergraduates awarded Pell grants
Percentage of the state population aged 25-64 with B.A.	Percentage of female students
Poverty rate - 150%	Percentage of non-white enrollment
Real GDP per capita	Percentage of part time enrollment
Student service expenses per FTE (GASB)	Percentage of the state population aged 25-64 with B.A.
Student-to-faculty ratio	Poverty rate - 150%
Total enrollment	Real GDP per capita
Unemployment Rate	State allocation to Higher Education (Percentage)
	Student service expenses per FTE (GASB)
	Total Enrollment
	Unemployment Rate

### ***Methodology***

The objective of this study is to determine if the inclusion of performance-based funding premiums provide their intended support for public HBCUs, as measured by graduation rates, retention rates, and appropriations given to these institutions by the state. To examine this central question, this paper employs a difference-in-differences design. Included in this model are year and institution fixed effects, as is the standard of similar studies examining the impact of PBF policies. Such models are widely used to examine policy implementation as such phenomenon are similar to natural experiments. Researchers studying the topic agree that PBF policies fall into this category as the adoption of such policies mark a drastic change to funding mechanisms, particularly in recent years as larger percentages of higher education funding are being tied to PBF models (Boland, 2020; Gandara & Rutherford, 2018; Tandberg & Hillman, 2014).

In the context of this paper, DiD fits particularly well as the treatment and control groups are well defined: HBCUs in states utilizing PBF premiums (treatment) and HBCUs in states not utilizing PBF premiums, but still utilizing a PBF model (control). This configuration works in that it upholds consistency within the model, meaning that the treatment group is comprised of states which have implemented premiums over the timeframe compared to a control group that has not. Additionally, by having the distinction between these two groups and a specific policy implementation as the point of change, this upholds the assumption of parallel trends as it provides a counterfactual to the policy of PBF premiums. While different policy implementation periods in this study require a staggered DiD model which acknowledges different implementation years, pre-implementation averages of the selected dependent variables demonstrate consistent and parallel trends. This finding is highlighted below in Graphic 1.1, which illustrates consistent trends between control and treatment groups in the absence of our defining treatment, here classified as the introduction of PBF premiums. Certainly, while state variation is inevitable, institutions sampled for this study appear to demonstrate consistent trends in key variables.

**Graphic 1: Outcome Variable Trends, Pre-implementation**



By including institution and year fixed effects, this model will be able to account for unobserved changes over time and across institutions. Institution fixed effects will allow the model to account for institutional factors not explicitly included in the model, such as tuition and funding trends, while year fixed effects will allow the model to account for environmental changes over time, such as economic expansion and contraction periods. Given that this study will utilize a panel regression with these fixed effects, the DiD regression model given institution  $i$  and year  $t$  is:

$$Y_{it} = \alpha + \beta_1(\text{treat} \times \text{post})_{it} + \beta_2(\text{policy time})_{it} + X_{it} + \gamma_i + \eta_t + \varepsilon_{it}.$$

Here,  $Y_{it}$  represents the given outcome variable in each institution ( $i$ ) for each year ( $t$ ), and  $\alpha$  represents the intercept. This study will utilize the three primary outcome variables specified above, graduation rates, retention rates, and state appropriations in separate regressions to thoroughly examine the impacts of PBF premiums on public HBCUs. Given that states implemented premiums at different points in time, the interaction term ( $\text{treat} \times \text{post}$ ) is set to 1 for all institutions in the years of and following premium adoption (Boland, 2020; Gandara & Rutherford, 2018). The variable ( $\text{policy time}$ ) was adopted from a similar study on PBF premiums conducted by Gandara and Rutherford, and accounts for the number of years which PBF premiums have been implemented (2018). Next,  $X_{it}$  represents the vector of control variables,  $\gamma_i$  represents institutional fixed effects,  $\eta_t$  represents year fixed effects, and  $\varepsilon_{it}$  is the error term.

## Findings

### *Descriptive Statistics*

Table 3 below displays the descriptive statistics for the variables used in this study across both treatment and control groups. Although the standard deviation for premium implementation is substantial, it should be noted that most of these policies have been implemented between 2012 and 2013. Overall, treatment and comparison groups are similar across most measures. In terms of the outcome variables utilized in this study, state apportionment to these institutions is very consistent, with institutions in treated states receiving 4% less on average. Graduation rates and full-time retention rates across these groups, while demonstrating similar trends, do reveal some differences across groups. Six-year graduation rates and full-time retention rates are 25% and 15% lower, respectively, compared to institutions in control states. Control variables across the groups are largely consistent, with the most substantial difference being in the percentage of state budgets going toward higher education. Non-premium states dedicate an average of 11% to higher education, while premium states allocate approximately 7% on average.

The differences highlighted here suggest that states utilizing premiums tend to spend less on higher education relative to the total budget. Additionally, it indicates that institutions in premium states have lower graduation and retention rates, on average. While it is important to acknowledge these distinctions, it should also be noted that both the treatment and control groups demonstrate similar, largely stable, trends in the outcome variables. These trends are illustrated above in Graphic 1. Though variation across some variables is present, this paper argues that institutions included in the sample provide a reasonable comparison across treatment and control groups. This is because the similarities across state and institutional factors, as well as the

similarities in institutional mission as HBCUs, provide consistency to uphold this aspect of the DiD design.

**Table 3: Descriptive Statistics for Key Variables**

Variable	Non-premium Institutions		Premium Institutions	
	Mean	SD	Mean	SD
Academic support expenses per FTE (logged)	7.84	0.19	7.69	0.50
Average amount of Pell grant aid awarded to full-time first-time undergraduates (logged)	8.54	0.10	8.49	0.16
Duration of any premium (years)	0.00	0.00	2.48	3.58
Duration of adult student premium (years)	0.00	0.00	0.74	1.84
Duration of low-income student premium (years)	0.00	0.00	2.48	3.58
Duration of minority student premium (years)	0.00	0.00	1.42	3.44
Full-time retention rate	0.73	0.06	0.62	0.11
Graduation rate - Bachelor degree within 6 years	0.39	0.07	0.29	0.10
In-state average tuition price (logged)	8.44	0.30	8.35	0.38
Out-of-state average tuition price (logged)	9.52	0.22	9.20	0.51
Percent of full-time first-time undergraduates awarded Pell grants	0.72	0.71	0.74	0.10
Percentage of female students	0.63	0.06	0.63	0.05
Percentage of non-white enrollment	0.88	0.05	0.91	0.12
Percentage of part time enrollment	0.17	0.06	0.20	0.08
Percentage of the state population aged 25-64 with B.A.	0.29	0.04	0.27	0.06
Poverty rate - 150%	0.16	0.02	0.17	0.04
Real GDP per capita	6.16	0.54	6.37	0.98
State allocation to Higher Education (Percentage)	10.78	0.97	7.07	2.34
State Apportionment (logged)	17.90	0.45	17.15	0.69
Student service expenses per FTE (logged)	7.31	0.58	7.60	0.49
Student-to-faculty ratio	0.16	0.16	0.17	0.28
Total Enrollment (logged)	8.56	0.58	8.25	0.68
Unemployment Rate	0.07	0.02	0.06	0.02

### *Impacts of Premiums on Six-year Graduation Rates*

Table 4 below provides the results of the analysis examining the impact of PBF premiums on six-year graduation rates at public HBCUs. Across each of the four models examining the different types of premiums, there is no statistically significant impact of premiums detected. However, in models examining the impacts of low-income, minority, and adult-student premiums, higher average Pell Grant awards are statistically significant and negatively correlated with graduation rates. Similarly, models examining the impact of low-

income, minority, and any premium configurations show statistically significant, negative correlation between the percentage of minority students enrolled and six-year graduation rates.

These models suggest that PBF premiums do not impact graduation rates across their target populations that attend public HBCUs. Additionally, given the impacts of Pell Grant sizes and proportions of minority students, these models further highlight some of the disparities across target populations. There are a multitude of ways in which successful student outcomes can be measured. However, graduation rates are key metrics of postsecondary institutional success and are widely used as a critical measure in PBF models. Therefore, these findings seem to indicate that PBF premiums are not providing sufficient incentive, or potentially financial resources, for mission-based institutions such as public HBCUs to make a difference in the success of the targeted underrepresented groups. Although the multi-faceted and frequently political process of turning funding dollars into student outcomes must be acknowledged, these premiums do not seem to produce their intended results with respect to this key outcome metric at public HBCUs.

**Table 4: PBF Premiums on Six-year Graduation Rates at Public HBCUs**

Variable	Any Premium	Minority Student Premium	Low-income Student Premium	Adult Student Premium
Treat_X_Post	-0.003 (.012)	0.009 (.012)	-.005 (.011)	-.013 (.014)
Duration of Premiums	0.000 (.002)	0.003 (.002)	.001 (.002)	-.003 (.003)
Total Enrollment (logged)	0.065 (.034)	0.065 (.033)	.065 (.033)	.076 (.036)*
Percentage of Part-time Enrollment	0.12 (.149)	0.154 (.131)	.123 (.147)	.102 (.132)
In-state Tuition (logged)	-0.027 (.041)	-0.029 (.042)	-.027 (.041)	-.034 (.039)
Avg. Pell Amount Given (logged)	-0.052 (.017)	-0.051 (.015)*	-.052 (.017)**	-.047 (.016)**
RGDP Per Capita (logged)	-0.017 (.022)	-0.014 (.024)	-.016 (.022)	-.012 (.023)
Poverty Rate	-0.08 (.376)	-0.11 (.394)	-.08 (.369)	-.16 (.39)
Unemployment Rate	0.178 (.328)	0.156 (.3)	.163 (.337)	.076 (.332)
Percentage of State Budget to Higher Education	-0.008 (.004)	-0.008 (.004)	-.008 (.004)	-.01 (.004)*
State Population 24-65 with B.A.	0.994 (.570)	0.837 (.534)	.958 (.553)	.944 (.520)
Student-to-faculty Ration	-0.003 (.002)	-0.003 (.002)	-.003 (.002)	-.004 (.002)
Academic Support Expenses (logged)	-0.0278 (.02)	-0.031 (.019)	-.028 (.019)	-.026 (.019)
Student services expenses (logged)	-0.029 (.023)	-0.022 (.023)	-.029 (.024)	-.029 (.023)
Percentage of Minority Students	-0.297 (.138)*	-0.294 (.138)*	-.298 (.137)*	-.273 (.148)
Percentage of FTE Students Receiving Pell	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
Constant	1.04 (.425)	1.029 (.435)	1.04 (.426)	.964 (.432)
rho	0.886	0.891	0.887	0.894
Institution Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes

\* p<.05 \*\* p<.01 \*\*\* p<.001

### *Impacts of Premiums on Full-time Retention Rates*

Table 5 provides the same modeling as in table 4 but utilizes full-time retention rates as the outcome variable. Results from all four models again show no statistically significant impact of PBF premiums compared to their non-premium PBF counterparts. Interestingly, the only statistically significant result is that of total enrollment, which shows a positive correlation with retention rates. While this is by no means concrete evidence of larger institutions faring better in PBF models than smaller schools, as some research has suggested, it does seem to merit further investigation on the topic. More relevant to the study at hand is the fact that retention rates, another key metric leveraged in numerous PBF models, seem to be unimpacted by premiums at public HBCUs compared to non-premium public HBCUs.



**Table 5: PBF Premiums on Full-time Retention Rates at Public HBCUs**

Variable	Any Premium	Minority Student Premium	Low-income Student Premium	Adult Student Premium
Treat_X_Post	.008 (.018)	-0.015 (.027)	0.001 (.016)	-0.001 (.017)
Duration of Premiums	-.006 (.003)	-0.005 (.002)	-0.005 (.003)	-0.011 (.006)
Total Enrollment (logged)	0.100 (.037)*	0.097 (.038)*	0.0980 (.038)*	0.113 (.034)*
Percentage of Part-time Enrollment	-0.000 (.138)	0.016 (.133)	0.014 (.138)	0.012 (.118)
In-state Tuition (logged)	0.003 (.048)	-0.003 (.046)	0.007 (.049)	-0.020 (.043)
Avg. Pell Amount Given (logged)	-0.032 (.030)	-0.029 (.029)	-0.028 (.030)	-0.014 (.031)
RGDP Per Capita (logged)	-0.029 (.034)	-0.040 (.034)	-0.030 (.035)	-0.025 (.033)
Poverty Rate	-0.390 (.517)	-0.254 (.500)	-0.425 (.511)	-0.500 (.524)
Unemployment Rate	0.382 (.290)	0.400 (.310)	0.352 (.298)	0.135 (.344)
Percentage of State Budget to Higher Education	-0.014 (.010)	-0.015 (.008)	-0.015 (.010)	-0.017 (.009)
State Population 24-65 with B.A.	1.165 (.713)	1.133 (.723)	1.04 (.723)	0.842 (.750)
Student-to-faculty Ration	-0.003 (.004)	-0.003 (.004)	-0.003 (.004)	-0.003 (.004)
Academic Support Expenses (logged)	0.013 (.028)	0.018 (.030)	0.013 (.029)	0.011 (.028)
Student services expenses (logged)	0.003 (.022)	0.003 (.023)	0.003 (.022)	0.011 (.020)
Percentage of Minority Students	0.390 (.218)	0.379 (.239)	0.388 (.221)	0.418 (.220)
Percentage of FTE Students Receiving Pell	0.001 (.001)	0.001 (.001)	0.001 (.001)	0.001 (.001)
Constant	-0.423 (.554)	-0.343 (.573)	-0.414 (.557)	-0.429 (.554)
rho	0.805	0.78	0.81	0.832
Institution Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

### *Impacts of Equity Premiums on State Apportionment to Public HBCUs*

Table 6 provides results for the models examining the impact of PBF premiums on state apportionment to selected HBCUs. Unlike the previous models, this model shows statistically significant results in two of the premium types: those for minority students and those for adult students. For minority student premiums, the model shows strong significance with a negative coefficient, suggesting that the presence of the premiums reduces apportionment. This is a particularly interesting result as premiums are intended to mitigate potential losses brought on by PBF models. One potential reason for this result could be related to findings that PBF premiums decrease selectivity relative to institutions operating under PBF policies with no premiums (Gandara & Rutherford, 2018). If premiums incentivize institutions to decrease selectivity within the target population, relative to institutions with non-premium PBF models, then it is possible

that the same premiums do not provide sufficient resources for institutions such as HBCUs to improve performance metrics overall. If HBCUs in these models cannot improve key metrics, then this finding may be the result of institutions losing more funding dollars from poorer metrics than they gain as a result of the premium. To this end, socioeconomic and educational disparities among underrepresented minority groups would likely be the driving factor of such an imbalance.

On the other hand, adult student premiums show significant, positive results on state apportionment to public HBCUs. This result is more likely to be anticipated, and desired, as it suggests that adult student premiums are correlated with higher apportionment for public HBCUs relative to institutions with non-premium PBF policies. While the coefficient here is small (.064), this premium category seems to provide significantly better results. Though there are many factors to consider in this regard, especially those relating to institutional demographic features, this result comes in stark contrast to the negative correlation detected with minority premium types. Other factors, such as PBF model variation across states or institutional demographic features, may also be impacting this result. These context-specific factors may also explain why some premium types provide the intended outcomes while others fall short.

**Table 6: PBF Premiums on State Apportionment to Public HBCUs**

Variable	Any Premium	Minority Student Premium	Low-income Student Premium	Adult Student Premium
Treat X Post	-0.055 (.031)	-0.125 (.031)**	-0.059 (.032)	0.064 (.031)*
Duration of Premiums	0.006 (.008)	0.0164 (.009)	0.007 (.008)	-0.033 (.008)**
RGDP Per Capita (logged)	-0.154 (.077)	-0.160 (.071)*	-0.145 (.076)	-0.137 (.075)
Poverty Rate	-3.298 (1.08)**	-3.020 (1.122)**	-3.189 (1.049)**	-3.264 (1.08)**
Unemployment Rate	-1.774 (.898)	-1.895 (.916)	-1.873 (.899)	-1.792 (.922)
Percentage of State Budget to Higher Education	0.064 (.016)**	0.066 (.014)**	0.063 (.016)**	0.0743 (.015)**
State Population 24-65 with B.A.	-3.761 (1.091)**	-3.700 (1.11)**	-3.822 (1.06)**	-2.176 (1.396)
Total Enrollment (logged)	0.229 (.092)*	0.250 (.097)*	0.243 (.089)*	0.262 (.082)**
Percentage of Part-time Enrollment	-0.559 (.584)	-0.602 (.579)	-0.562 (.584)	-0.838 (.547)
Graduation Rate	-0.088 (.188)	-0.085 (.194)	-0.094 (.185)	-0.117 (.191)
Retention Rate	0.011 (.150)	-0.001 (.141)	0.002 (.145)	-0.069 (.143)
Academic Support Expenses (logged)	0.171 (.046)**	0.175 (.041)**	0.169 (.046)**	0.152 (.043)**
Student services expenses (logged)	0.003 (.082)	0.019 (.092)	0.007 (.083)	0.005 (.088)
Avg. Pell Amount Given (logged)	-0.130 (.081)	-0.126 (.078)	-0.132 (.080)	-0.141 (.074)
Percentage of FTE Students Receiving Pell	0.001 (.001)	0.001 (.001)	0.001 (.001)	0.001 (.001)
In-state Tuition (logged)	0.064 (.101)	0.018 (.092)	0.052 (.099)	-0.014 (.092)
Percentage of Minority Students	-0.572 (.393)	-0.516 (.398)	-0.590 (.385)	-0.506 (.361)
Out-of-State Tuition (logged)	-0.050 (.039)	-0.051 (.041)	-0.050 (.039)	-0.055 (.036)
Percentage of Female Students	-1.363 (.545)	-1.257 (.571)	-1.420 (.540)	-1.266 (.490)*
Constant	18.730 (1.25)	18.639 (1.29)	18.740 (1.233)	18.76239
rho	0.977	0.977	0.977	0.972
Institution Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes

\* p<.05 \*\* p<.01 \*\*\* p<.001

## Discussion and Conclusions

The primary purpose of this study was to see if PBF premiums fulfilled their intended goals of improving student success in underrepresented groups and providing financial support for institutions at risk of being financially harmed as the result of PBF implementation. To accomplish this, it examined two key performance metrics in graduation and retention rates, as well as institutional apportionment granted by each respective state. Applying resource dependence theory, we would anticipate that institutions would act in alignment with state PBF policies to maintain their funding levels and that premiums would provide a tool for institutions such as HBCUs to meet the state-prescribed goals. However, institutional features, historical funding disparities, and variation in PBF modeling may throw roadblocks into a seemingly straight-forward solution. Though PBF premiums were created to alleviate equity concerns and

unintended adverse consequences of PBF models, there is still much work to be done to determine the efficacy of these solutions.

This study finds little evidence of PBF premiums impacting student success, as measured by graduation and retention rates, or institutional apportionment from state governments. Regarding graduation and retention rates, no statistically significant results were obtained through this analysis. This study does find limited evidence of PBF premiums impacting institutional apportionment. Specifically, results suggest an unexpected negative correlation between minority student premiums and state apportionment, potentially indicating that some premium types are insufficient for public HBCUs to maintain funding levels. To the contrary, this study identified positive correlation between adult student premiums and state apportionment, providing some limited evidence that specific premium types may provide some benefits for public HBCUs if placed in the right context.

While results provide mixed evidence that warrants further investigation, the implications of this study are important. HBCUs have been vital institutions for the advancement of civil rights in America. These schools have historically provided very real and tangible results for Black students, awarding higher numbers of degrees to Black students compared to non-HBCUs (Boland, 2020). HBCUs have been engines of social mobility for low-income and underrepresented students for decades, and given recent financial trends in higher education, many of these institutions are in danger of closing their doors. It is critical that states consider HBCUs, as well as other MSIs, when crafting funding mechanisms; the service mission of these institutions present unique circumstances that differ from flagship institutions.

As more states transition to PBF models, work must be done to mitigate the adverse impacts of these policies on underrepresented communities and the institutions tailored to serve them. While this study emphasizes public HBCUs as its primarily analytical focus, there are a number of other small, underfunded institutions feeling the adverse impacts of these policies. Though this study does not provide universal evidence on the efficacy of premiums, it contributes to the current literature by examining the impacts of state funding policies on understudied institutions. Though it is vital to note that other studies have identified some promising trends suggesting that premiums may improve accessibility at institutions operating in PBF states (Gandara & Rutherford, 2018), this study suggests that premiums alone cannot fully repair the problems that they are intended to address. While premiums may be a step toward addressing the adverse consequences brought about by PBF policies, there is no substantial evidence suggesting that they are sufficient for achieving the goals for which they have been created.

In terms of policy considerations, state governments may consider expanding the current forms of premiums to provide additional funds for targeted populations. While no clear outcome data is available for this method, Tennessee made this change when it increased premium rates from 40% to 80% in 2015 (Callahan, et al., 2017). Another potential solution would be instituting provisions that would functionally exempt smaller institutions or mission-specific institutions such as HBCUs from the model. This approach could also be fashioned such that institutions are guaranteed a level of funding adjusted for inflation or enrollment, regardless of metric outcomes. One example of an approach like this is in Kentucky's current PBF model, which utilizes hold harmless and stop-loss provisions, at least in the early years of implementation, to functionally mitigate financial harm (Council on Postsecondary Education,

2020; KRS 164.092). While there has not yet been a definitive solution for these problems, state policymakers must take initiative to address inequities within their funding models.

## **Limitations & Future Study**

Though this study holds value as part of a growing literature surrounding PBF policies, their consequences, and the current response measures in place for adverse implications of the models, it is still limited in its scope and specificity. There are three primary limitations recognized with this study. First and most pressing is the fact that this study does not account for the differences and specifications across various types of performance-based funding models. PBF models vary widely both in terms of the metrics they use to evaluate institutional performance, as well as the exact percentage of funding that is tied to the PBF model. This study sought to mitigate some impacts of this by restricting the time sample to 2007-2019, as this is the cutoff generally acknowledged as the transition toward PBF 2.0 models of funding. While all of the models included in this study were PBF 2.0 for most, if not all, of the time periods sampled, the exact percentages of funding tied to the models varied widely. At the time of writing, more models are seeking to allocate larger portions of funding via PBF models. However, this trend is by no means universal, and this transition has yet to be observed over a substantial period of time. Future studies should seek to include metric specifications and funding percentages in their models in order to more appropriately account for such variance across models.

Secondly, this study, like most quasi-experimental approaches, is subject to omitted variable bias (Boland, 2020; Zhang & Ness, 2010) and other methodological imperfections. Most notably, this study's limited sample size and composition poses an issue for statistical power. While sampled institutions comprise a substantial proportion of the population being studied, the

limited sample size and state-level variation mean that this model may be unable to detect the full effect of PBF premiums. Thus, results obtained through this study may be biased given this limitation. It is important for future studies to expand the scale of sampling to produce more reliable and consistent results.

Additionally, Though the study incorporated numerous controls and fixed effects to focus the model on the specific impacts, it is always possible that other underlying factors may skew results. This is particularly true with studies examining large, multi-faceted topics across various states and entities. Included in this methodological limitation is the fact that this study may also suffer from anticipatory effects of the PBF premium introduction. Though this study and similar studies took care to utilize operational dates for premium implementation, finding the exact cutoff is nearly impossible for every state given inconsistent reporting and implementation procedures. Given the absence of standardization both in the models themselves and in the reporting surrounding them, there is much grey area to be explored.

Third and finally, this study does not include comparative groups, such as other MSIs, non-MSI institutions, junior colleges, or private institutions. While these groups fall outside of the scope of this project, future research would benefit from incorporating additional comparative groups in order to more accurately assess the impact of PBF premiums. This would also help to provide a robustness check for the DiD model used in this study. This study hopes to contribute to the larger literature by examining the impacts of these policies on under-studied institutions. However, more must be done to examine PBF policies in a broader context if definitive answers are sought.

## Citations

- Anderson, M. (2017, February 28). A Look at Historically Black Colleges and Universities as Howard Turns 150. *Pew Research Center - Factank*.
- Birdsall, C. (2018). Performance Management in Public Higher Education: Unintended Consequences and Implications of Organizational Diversity. *Public Performance and Management Review*, 669-695.
- Boland, W. (2020). Performance Funding and Historically Black Colleges and Universities: An Assessment of Financial Incentives and Baccalaureate Degree Production. *Educational Policy*, 644-673.
- Boland, W., & Gasman, M. (2014). *America's Public HBCUs: A Four State Comparison Considering Institutional Capacity and State Funding Priorities*. Philadelphia: Penn Center for Minority Serving Institutions.
- Callahan, K., Meehan, K., Shaw, K., Slaughter, A., Kim, D., Hunter, V., . . . Wainstein, L. (2017). *Implementation and Impact of Outcomes-Based Funding in Tennessee*. Philadelphia: Research for Action.
- Dougherty, K., & Natow, R. (2015). *The Politics of Performance Funding for Higher Education: Origins, Discontinuities, and Transformations*. Baltimore: John Hopkins University Press.
- Dougherty, K., & Reddy, V. (2013). Performance Funding for Higher Education: What are the Mechanisms? *ASHE Higher Education Report*, 1-152.
- Dougherty, K., Jones, S., Lahr, H., Natow, R., Pheatt, L., & Reddy, V. (2016). Looking Inside the Black Box of Performance Funding for Higher Education: Policy Instruments, Organizational Obstacles, and Intended and Unintended Impacts. *The Russell Sage Foundation Journal of Social Sciences*, 147-173.
- Education, A. C. (2019, January 22). *ACE Brief Illustrates HBCU Funding Inequities*. Retrieved from American Council on Education: <https://www.acenet.edu/News-Room/Pages/ACE-Brief-Illustrates-HBCU-Funding-Inequities.aspx>
- Education, C. o. (2020, July 30). *Postsecondary Education Working Group Performance Funding Model Review*. Retrieved from Kentucky Council on Postsecondary Education: [http://cpe.ky.gov/aboutus/records/perf\\_funding/agenda-2020-07-30-pf.pdf](http://cpe.ky.gov/aboutus/records/perf_funding/agenda-2020-07-30-pf.pdf)
- Education, U. D. (2018). *Fast Facts: Historically Black Colleges and Universities*. Retrieved from National Center for Education Statistics: <https://nces.ed.gov/fastfacts/display.asp?id=667>
- Gandara, D., & Rutherford, A. (2018). Mitigating Unintended Impacts? The Effects of Premiums for Underserved Populations in Performance-Funding Policies for Higher Education. *Research in Higher Education*, 681-703.



- Gasman, M. (2010). *Comprehensive Funding Approaches for Historically Black Colleges and Universities*. Philadelphia: Penn Graduate School of Education.
- Gasman, M., & Palmer, R. (2008). *'It Takes a Village to Raise a Child': The Role of Social Capital in Promoting Academic Success for African American Men at a Black College*. Philadelphia: University of Pennsylvania Graduate School of Education.
- Hagood, L. (2019). The Financial Benefits and Burdens of Performance Funding in Higher Education. *Educational Evaluation and Policy Analysis*, 189-213.
- Hillman, N., & Corral, D. (2018). The Equity Implications for Performance in Higher Education. *American Behavioral Scientist*, 1557-1572.
- Hillman, N., Tandberg, D., & Gross, J. (2014). Performance Funding in Higher Education: Do Financial Incentives Impact College Completions? *The Journal of Higher Education*, 826-857.
- Hirt, J., Strayhorn, T., Amelink, C., & Bennett, B. (2006). The Nature of Student Affairs Work at Historically Black Colleges and Universities. *Journal of College Student Development*, 661-676.
- Jones, T. (2014). *Performance Funding at MSIs: Considerations and Possible Measures for Public Minority-serving Institutions*. Atlanta: Southern Education Foundation.
- Jones, T., Jones, S., Russell, L., Assalone, A., Elliot, K., & Gandara, D. (2017). *Outcomes Based Funding and Race in Higher Education*. Palgrave Macmillan.
- Kelchen, R. (2017). *A Look at Pell Grant Recipients' Graduation Rates*. Washington D.C.: Brookings.
- Kelchen, R. (2019). Exploring the Relationship Between Performance-based Funding Design and Underrepresented Student Enrollment at Community Colleges. *Community College Review*, 382-405.
- Kelchen, R., & Stedrak, L. (2016). Does Performance-based Funding Affect Colleges' Financial Priorities? . *Journal of Education Finance*, 302-321.
- Li, A. Y., & Kennedy, A. (2018). Performance Funding Policy Effects on Community College Outcomes: Are Short-Term Certificates on the Rise? . *Community College Review*, 3-39.
- Mckinney, L., & Hagedorn, L. (2017). Performance-based Funding for Community Colleges in Texas: Are Colleges Disadvantaged by Serving the Most Disadvantaged Students? *The Journal of Higher Education*, 159-182.
- Ortagus, J., Kelchen, R., Rosinger, K., & Voorhees, N. (2020). Performance-Based Funding in American Higher Education: A Systematic Synthesis of the Intended and Unintended Consequences. *Educational Evaluation and Policy Analysis*, 520-550.
- Price, G. (2020, June 24). *1 in 10 HBCUs Were Financially Fragile Before COVID-19 Endangered All Colleges and Universities*. Retrieved from The Conversation:

- <https://theconversation.com/1-in-10-hbcus-were-financially-fragile-before-covid-19-endangered-all-colleges-and-universities-140528>
- Rizzo, M., & Ehrenberg, R. (2004). *Resident and Nonresident Tuition and Enrollment at Flagship State Universities*. Chicago: University of Chicago Press.
- Rutherford, A., & Rabovsky, T. (2014). Evaluating Impacts of Performance Funding Policies on Student Outcomes in Higher Education . *The ANNALS of the American Academy of Political and Social Science*, 185-208.
- Sanford, T., & Hunter, J. (2011). Impact of Performance-funding on Retention and Graduation Rates. *Education Policy Analysis Archives*, 1-27.
- Shin, J. C. (2010). Impacts of performance-based accountability on institutional performance in the U.S. . *Higher Education*, 47-68.
- Tandberg, D., & Hillman, N. (2014). State Higher Education Performance Funding: Data, Outcomes, and Policy Implications. *Journal of Education Finance*, 222-243.
- Tandberg, D., Hillman, N., & Barakat, M. (2014). State Higher Education Performance Funding for Community Colleges: Diverse Effects and Policy Implications. *Teachers College Record*, 1-31.
- Umbricht, M., Fernandez, F., & Ortagus, J. (2017). An Examination of the (Un)intended Consequences of Performance Funding in Higher Education. *Educational Policy*, 643-673.
- Verbruggen, S., Christiaens, J., & Milis, K. (2011). Can Resource Dependence and Coercive Isomorphism Explain Nonprofit Organizations' Compliance with Reporting Standards? *Nonprofit and Voluntary Sector Quarterly*, 5-32.
- Volkwein, F., & Tandberg, D. (2008). Measuring Up: Examining the Connections Among State Structural Characteristics, Regulatory Practices, and Performance. *Research in Higher Education*, 180-197.
- Zhang, L. (2009). Does State Funding Affect Graduation Rates at Public Four-Year Colleges and Universities? *Educational Policy*, 714-731.
- Zhang, L., & Ness, E. (2010). Does State Merit-based Aid Stem Brain Drain? *Educational Evaluation and Policy Analysis*, 143-165.
- Zhao, B. (2018). *Disinvesting in the Future? A Comprehensive Examination of the Effects of State Appropriations for Public Higher Education (Working Paper)*. Boston: Federal Reserve Bank of Boston.