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THE UNEQUAL IMPACTS OF PERFORMANCE-BASED FUNDING ON INSTITUTIONAL RESOURCES IN HIGHER EDUCATION

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Public colleges and universities have traditionally received state funding based solely on their number of enrolled students and prior year's appropriations,[1] but performance-based funding (PBF) policies that link at least a portion of state appropriations to institutional outcomes have become a staple of higher education finance in recent decades. Although 41 states have implemented PBF at some point as of Fiscal Year 2020,[2] the design of PBF policies looks very different across PBF-adopting states.

The presence of a high-dosage PBF system had a negative effect on state appropriations per FTE student for MSIs. We also found that adopting a high-dosage PBF policy had a negative impact on every measure of state appropriations per FTE student and revenue obtained from state appropriations among four-year HBCUs.

To exemplify this point, we look to the considerable variations in the percentage of state funding tied to outcomes or the "dosage" of PBF policies. Arkansas allocates 3% of state appropriations to PBF, Nevada allocates 20% of state appropriations to PBF, and Kentucky allocates 70% of state appropriations to PBF.[3] Among the 32 states that currently have a PBF system in place, roughly 60%

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[1] Layzell, D. T. (1999). Linking performance to funding outcomes at the state level for public institutions of higher education: Past, present, and future. *Research in Higher Education, 40*(2), 233–246.

[2] Rosinger, K. O., Ortagus, J. C., Kelchen, R., Cassell, A., Voorhees, N. (2020). *The landscape of performance-based funding in 2020*. InformEd States.

[3] Ortagus, J. C., 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*, *42*(4), 520-550.

incentivize completion outcomes among racially minoritized students in their PBF formula. A higher percentage (80%) of PBF-adopting states include financial incentives for graduating low-income students in their PBF formula,[4] which suggests that some policymakers may avoid including race/ethnicity metrics in their PBF policy design.[5]

A substantial body of literature has examined the effects of PBF on college access and student success metrics,[6] but less is known about the financial implications of PBF adoption.[7] A serious concern pertaining to PBF in higher education is the potential for an inequitable funding system in which already under-resourced institution types, such as community colleges and minority-serving institutions, receive even fewer resources.[8] Historically Black colleges and universities (HBCUs) and other minority-serving institutions (MSIs) receive far less per-student state funding than predominantly white institutions,[9] and institutions with higher percentages of Pell Grant recipients receive less state support than those with fewer lower-income students.[10] If a given PBF system shifts appropriations from under-resourced institutions serving large shares of low-income and racially minoritized students to higher-performing institutions serving large shares of higher-income and white students, the challenges facing under-resourced institutions and their underserved students will become exacerbated.

To explore these issues, we address the following research questions:

> ***Research Question 1:*** To what extent do PBF policies impact institutions' revenue from state appropriations and state appropriations per FTE student?
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> ***Research Question 2:*** Do results vary according to the design of the PBF policy?

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[4] Rosinger, K. O., Ortagus, J. C., Kelchen, R., Cassell, A., Voorhees, N. (2020). *The landscape of performance-based funding in 2020*. InformEd States.

[5] Gándara, D. (2020). How the sausage is made: An examination of a state funding model design process. *The Journal of Higher Education*, *91*(2), 192-221.

[6] Ortagus, J. C., 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*, *42*(4), 520-550.

[7] Hagood, L. P. (2019). The financial benefits and burdens of performance funding in higher education. *Educational Evaluation and Policy Analysis*, *41*(2), 189-213.

[8] Hillman, N. W., Corral, D. (2018). The equity implications of paying for performance in higher education. *American Behavioral Scientist, 61*(14), 1557–1572.

[9] Boland, W. C., Gasman, M. (2014). America's public HBCUs: A four state comparison of institutional capacity and state funding profiles. Penn Graduate School of Education. // Cunningham, A., Park, E., Engle, J. (2014). Minority-serving institutions: Doing more with less. Institute for Higher Education Policy.

[10] Goldrick-Rab, S., Kolbe, T. (2015, September 28). Rethinking state support for higher ed. Inside Higher Ed. Retrieved from https://www.insidehighered.com/views/2015/09/28/essay-need-consider-which-institutions-should-bear-brunt-state-cuts-public-higher

Research Question 3: Do results vary according to institution type?

We combined the InformEd States Performance-Based Funding Policies Dataset [11] with Integrated Postsecondary Education Data System (IPEDS) data to create a panel covering 1997-2019. The outcome variables of interest for this study are state funding per full-time equivalent (FTE) student and the total amount of institutional revenue derived from state appropriations. The treatment variables vary across specifications, including the adoption of *any* funded PBF policy, a low-dosage PBF policy (fewer than 10% of state funds tied to institutional performance), and a high-dosage PBF policy (10% or more of state funds tied to institutional performance). The comparison group for PBF-adopting institutions, regardless of dosage, includes only institutions that were not subject to a PBF policy. In addition, we consider equity-oriented treatment variables—PBF policies including metrics for racially minoritized students [12] and PBF policies including metrics for low-income students. We run separate models for public community colleges, public four-year institutions, institutions serving an above-average share of racially minoritized students, institutions serving an above-average share of low-income students, [13] and MSIs, HBCUs, and Hispanic-serving institutions (HSIs).

To answer our research questions, we employ a generalized difference-in-differences design with two-way fixed effects. Our first specification for all models is a naïve model including only the treatment of interest and fixed effects. Our second specification for all models includes the treatment of interest, fixed effects, and institution-level (e.g., institutional size, pricing, percent of part-time students) and state-level covariates (e.g., unemployment, proportion of residents who earned a bachelor's degree or higher, per-capita income).[14] In response to recent developments in econometrics literature outlining issues with time-varying treatment adoption,[15] we include a series of event studies to account for both staggered PBF adoption and heterogeneous treatment effects.

For four-year universities, we found no relationship between the adoption of *any* funded PBF policy and various measures of state funding; however, we showed concentrated impacts of PBF adoption on state funding depending on the design of the PBF policy and institution type. For the pooled sample of all public four-year institutions, we found that high-dosage PBF adoption had a negative effect on state appropriations

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[11] Ortagus, J., Rosinger, K., & Kelchen, R. (2021). *InformEd States performance-based funding policies dataset.* InformEd States. Retrieved from informedstates.org/data.

[12] PBF policies typically define racially minoritized students as Black, Hispanic, and Native American students.

[13] Because IPEDS data do not provide a perfect measure for low-income student enrollment, we define low-income students as students who received federal grant aid, which serves as a proxy for Pell grant aid directed toward low-income students.

[14] We clustered standard errors at the state level.

[15] Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*. // Sun, L., & Abraham, S. (2020). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*.

per FTE student for institutions serving an above-average share of racially minoritized students. This negative impact was no longer statistically significant when the PBF-adopting states included an incentive for graduating racially minoritized students. We found no relationship between any type of PBF policy, including those that incentivized low-income student completions, and state funding measures for four-year institutions serving an above-average share of low-income students.

We offer several noteworthy findings when considering the MSI status of the public four-year institution. Similar to the previous finding pertaining to four-year institutions serving an above-average share of racially minoritized students, the presence of a high-dosage PBF system had a negative effect on state appropriations per FTE student for MSIs. We also found that adopting a high-dosage PBF policy had a negative impact on every measure of state appropriations per FTE student and revenue obtained from state appropriations among four-year HBCUs. Surprisingly, there was no relationship between the presence of a high-dosage PBF system and state funding for four-year HSIs.

Although we found that adopting *any* funded PBF policy has some positive effects on state funding for community colleges, these effects are concentrated primarily among low-dosage PBF policies and non-MSI institutions. Specifically, the presence of a low-dosage PBF system had a positive impact on state appropriations per FTE student and revenue obtained from state appropriations for community colleges, particularly among non-MSI community colleges. There was typically no relationship between low-dosage PBF adoption and state funding among MSI community colleges, but the presence of a high-dosage PBF system had a negative impact on state appropriations per FTE student for MSI community colleges in our naïve model that did not include covariates. Finally, low-dosage PBF policies had a positive impact on the revenue obtained from state appropriations for community colleges regardless of the proportion of low-income students enrolled at the two-year institution, but the magnitude of the positive effects were greater among community colleges serving a below-average share of low-income students.

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