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THE RELATIONSHIPS BETWEEN STATE HIGHER EDUCATION FUNDING STRATEGIES AND COLLEGE ACCESS AND SUCCESS

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States invest in public higher education to grow the state's economy and foster social mobility for students from historically under-represented populations. Research has shown a positive relationship between the amount of state funding for public higher education and key student success metrics, such as the number of completions and post-college earnings.[1]

We find some evidence that combining traditional and incentive components increases enrollment in the two-year sector, but questions still remain about whether a funding formula can increase student completions without also providing more money to support students through college.

States allocate funds to public higher education institutions through a range of mechanisms. These include using enrollment metrics to determine funding, performance-based funding (PBF) systems that tie funding to student outcomes, base-adjusted funding systems that provide across-the-board increases (or decreases) to colleges, a combination of these mechanisms, or no clear funding formula. Yet the only mechanism to be rigorously examined in the

[1] Bound, J., Braga, B., Khanna, G., & Turner, S. (2019). Public universities: The supply side of building a skilled workforce. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, *5*(5), 43-66.; Chakrabarti, R., Gorton, N., & Lovenheim, M. F. (2020). *State investment in higher education: Effects on human capital formation, student debt, and long-term financial outcomes of students.* Federal Reserve Bank of New York Staff Report No. 941.; Deming, D. J., & Walters, C. R. (2017). *The impact of price caps and spending cuts on US postsecondary attainment*. National Bureau of Economic Research Working Paper 23736.; Horn, A. S., Horner, O. G., Tandberg, D. A., Toutkoushian, R. K., & Williams-Wyche, S. N. (2021). *The effect of state appropriations on college graduation rates of diverse students*. Midwestern Higher Education Compact.; Monarrez, T., Hernandez, F., & Rainer, M. (2021). *Impact of state higher education finance on attainment*. Urban Institute.

literature is PBF, which is less than ten percent of all state funding for public colleges and universities.[2] PBF research finds null or modest effects on enrollment and completion outcomes, with concerns about unintended impacts that have the potential to widen longstanding gaps by race/ethnicity and family income unless systems are carefully designed.[3]

Our work leverages novel data and represents the first effort to examine the relationship between a range of different higher education funding strategies and student enrollment and completion outcomes. While there have been occasional snapshots of state funding mechanisms, there has not been a systematic effort to track how states fund public higher education over time (aside from PBF).[4] We compiled the first longitudinal dataset with detailed funding information to help us examine whether different funding strategies have a relationship with college access and completion, with a focus on outcomes among racially minoritized students. Our research questions are:

1. ***Do different mechanisms of providing state funding to public colleges and universities affect student enrollment outcomes?***
2. ***Do different mechanisms of providing state funding to public colleges and universities affect student completion outcomes?***
3. ***Do results vary according to students' race/ethnicity?***

Sample, Data, and Methods

We collected data on how state legislatures, governing boards, and coordinating agencies provided money to individual institutions, using our team's data collection guidelines as our template.[5] We collected data between Fiscal Years 2004 and 2021 through examining nearly 3,500 artifacts, including state budgets, approved legislation, board meeting packets, and financial statements.[6] Our default unit of data collection

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[2] Rosinger, K., Ortagus, J. C., Kelchen, R., Cassell, A., & Brown, L. (2022). New evidence on the landscape and evolution of performance funding for higher education. *Journal of Higher Education, 93*(5), 735-768

[3] For a review, see 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.

[4] Layzell, D. T. (2007). State higher education funding models: An assessment of current and emerging approaches. *Journal of Education Finance, 33*(1), 1-19.; Mullin, C. M., & Honeyman, D. S. (2007). The funding of community colleges: A typology of state funding formulas. *Community College Review, 35*(2), 113-127.; Syverson, E., Whinnery, E., & Pingel, S. (2020, April). 50-state comparison: Postsecondary education funding. Education Commission of the States. https://www.ecs.org/50-state-comparisonpostsecondary-education-funding/.

[5] Kelchen, R., Rosinger, K. O., & Ortagus, J. C. (2019). How to create and use state-level policy data sets in education research. *AERA Open, 5*(3), 1-14. https://doi.org/10.1177/2332858419873619.

[6] Most of our data were collected through documents that were available online through state or system agency websites or archived pages from the Internet Archive: Wayback Machine. We had weekly research team meetings to check data across multiple individuals collecting data, resolve any areas of confusion, and identify missing data. Finally, we contacted state agencies and higher education systems with any remaining questions.

was the sector by state level, with sector (two-year versus four-year) defined using Carnegie classifications.[7] In some cases, colleges within a sector were subject to different funding mechanisms due to their membership in a system that had the ability to allocate state funding directly to institutions or was treated differently in state legislation. We coded those cases (seven in the four-year sector and four in the two-year sector) separately.

We focused on three primary funding mechanisms: traditional, incentive, and hybrid models. Traditional models included base-adjusted models and no funding formula, which we coded if we could not find evidence of an active funding formula and year-to-year funding changes across institutions did not reflect a base-adjusted model. Incentive funding included enrollment-based funding, in which colleges received funding based on the number of students enrolled and performance funding, for which we drew upon previous data collection.[8] Finally, we coded for the presence of hybrid models if both traditional and incentive components were present. For example, Louisiana's Board of Regents allocated 63% of funding using a base-adjusted model, 20% using performance funding, and 17% using a mix of enrollment and facilities expenses in 2020.[9]

Table 1 shows the frequency of funding formula models by sector at three points during the period of study: 2004, 2012, and 2020. In 2004, traditional models were the most common in the four-year sector (46% of all institutions), followed by hybrid models (40%) and incentive models (14%). During the panel, there was a gradual shift toward hybrid models (52% by 2020) at the expense of traditional models (41%) and incentive models (7%). Enrollment-only models disappeared from the four-year sector, while models combining base and enrollment components became more popular. Among two-year institutions, hybrid models were the most common throughout the panel, increasing from 57% in 2004 to 72% in 2020. That largely came at the expense of traditional models. Hybrid models that included base, enrollment, and performance categories covered 4% of two-year colleges in 2004, but increased to 48% in 2020.

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[7] We classified institutions with the Carnegie classification of baccalaureate/associate colleges as two-year institutions to reflect their primary degree offerings and how they are typically viewed by states.

[8] Rosinger, K., Ortagus, J. C., Kelchen, R., Cassell, A., & Brown, L. (2022). New evidence on the landscape and evolution of performance funding for higher education. *Journal of Higher Education, 93*(5), 735-768.

[9] Louisiana Board of Regents (2021). *Funding formula summary*. https://regents.la.gov/wp-content/uploads/2021/07/Funding-Formula-Summary-FY22.pdf.

Table 1: Frequency of funding formula models by sector and year.

	Four-year Universities			*Two-year colleges*		
Funding model (pct)	FY04	FY12	FY20	FY04	FY12	FY20
Traditional model	**45.7**	**49.9**	**40.8**	**19.2**	**18.9**	**7.0**
No formula	23.8	24.0	24.1	4.3	7.8	2.6
Base adjusted only	22.9	26.8	17.6	15.3	11.9	5.1
Incentive model	**13.9**	**2.0**	**7.2**	**23.6**	**13.7**	**21.4**
Enrollment only	13.7	0	0	23.6	13.7	7.7
Performance only	0.2	0.7	5.6	0	0	4.5
Enrollment+performance	**0**	**1.3**	**1.6**	**0**	**0**	**9.2**
Hybrid model	40.4	48.1	51.9	57.2	67.3	71.5
Base+enrollment	30.9	34.4	23.4	46.3	49.1	13.2
Base+performance	**2.4**	**5.1**	**18.5**	**7.0**	**2.9**	**10.7**
Base+enrollment+performance	7.1	8.6	10.0	3.9	15.3	47.7

Source: Authors' data collection.

Notes:
(1) The three main models (traditional, incentive, and hybrid) add up to 100 percent.
(2) Categories may not exactly add up due to rounding.
(3) Observations are at the institution level, not the system level.

We had two sets of outcomes with one focused on access metrics and the other on completion metrics. Access metrics come from the Integrated Postsecondary Education Data System (IPEDS) and reflect the number of first-time undergraduate students in several categories. We began with all students and then focused on racially minoritized students (Black, Hispanic, and Native American). We next considered the number of Black and Hispanic students separately due to evidence that state funding policies affect students across different racial/ethnic groups differently.[10] We then separately examined the number of White and Asian students. We also examined undergraduate bachelor's degree (four-year universities) and associate degree and certificate completions (two-year colleges) using IPEDS data. We examined the same subgroups of students for completion as for first-time undergraduate enrollment. We adjusted for several institution-level and state-level characteristics that could also affect student enrollment and completions.

We examined the relationship between state funding models and student enrollment and completion outcomes using panel regressions with two-way (state and year) fixed effects. We used traditional models as

[10] Gándara, 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, 59*, 681-703.

the reference group and examined whether the relationships differed based on the presence of an incentive or hybrid funding model. We lagged (logged) enrollment and completion outcomes to provide institutions with an opportunity to respond to funding model changes. For enrollment of first-year students, we focused on enrollment levels in the year following when the funding model was measured. For the number of completions, we focused on five years after the funding model was measured for bachelor's degrees, three years later for associate degrees, and two years later for certificates. We used these delays to allow students who entered college around when the funding model was measured to complete their credentials.

Compared to the reference group of traditional funding mechanisms, we did not find a consistent relationship between the presence of an incentive funding model and student enrollment. However, there is some evidence that hybrid funding models may have increased the enrollment of White, Asian, and Black students in the two-year sector. This suggests that funding based on a combination of a protected base and rewards for enrolling and/or graduating more students may help increase enrollment levels in the following year.

We then examined the relationship between the type of funding model and the number of degrees or certificates produced in future years. We found no evidence of a relationship between either incentive or hybrid funding models and credential production. This suggests that although hybrid funding mechanisms may have increased enrollment of new community college students, they did not lead to increases in completions. Additionally, the null relationships in the four-year sector provide evidence that funding mechanisms are not effective in moving the needle on completions.

Prior work suggests that performance funding systems may exacerbate racial inequities to a further extent than other funding models.[11] Our study offers insight into the other mechanisms states use to allocate funds for public colleges and universities and their relationship to student enrollment and completion outcomes. We find some evidence that combining traditional and incentive components increases enrollment in the two-year sector, but questions still remain about whether a funding formula can increase student completions without also providing more money to support students through college.

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[11] Jones, T., Jones, S., Elliott, K. C., Owens, L. R., Assalone, A. E., & Gándara, D. (2017). *Outcomes based funding and race in higher education: Can equity be bought?* New York, NY: Palgrave MacMillan.; Ortagus et al. (2020).