DRAFT Final Report

Study on Higher Education Performance Funding and Efficiency/Reform (RFPS30034902300023)

Prepared for the Missouri Department of Higher Education and Workforce Development
June 7, 2023

Executive Summary

In response to Missouri House Bill 3003, the Missouri Department of Higher Education and Workforce Development (MDHEWD) contracted with the National Center for Higher Education Management Systems (NCHEMS) to conduct a review of state higher education performance funding models, create a recommended funding model for the state of Missouri, and review efficiency measures for Missouri's public postsecondary institutions.

A review of higher education performance funding models finds that performance funding approaches have mixed results when it comes to achieving their goals. In some cases, they may lead to exacerbating success gaps among students or manipulation by institutions or systems in ways that yield unintended results. Additionally, performance models that do not reform the base funding model to which they are appended will have limited impact, generally because the base funding model has not funded institutions adequately or equitably and because the performance model has exacerbated competitive impulses among the institutions in ways that are unproductive and misaligned with state goals. Finally, most states do not use performance funding to direct large shares of state appropriations.

Moreover, Missouri's public four-year institutions have experienced a reduction in funding provided by the state on a per-student, inflation-adjusted basis, with these losses being absorbed by students through increased tuition payments that have risen faster than the nation's as a whole. This state- and sector-wide reality obscures substantial variation among the institutions, ranging from institutions that depend on the state for as much as 80 percent of total funding to others that receive just about a third of their support from the state. This calls into question the degree to which institutions receive state support at levels that provide them a reasonably equitable chance to generate adequate levels of total support from the state, local government, and students (via tuition).

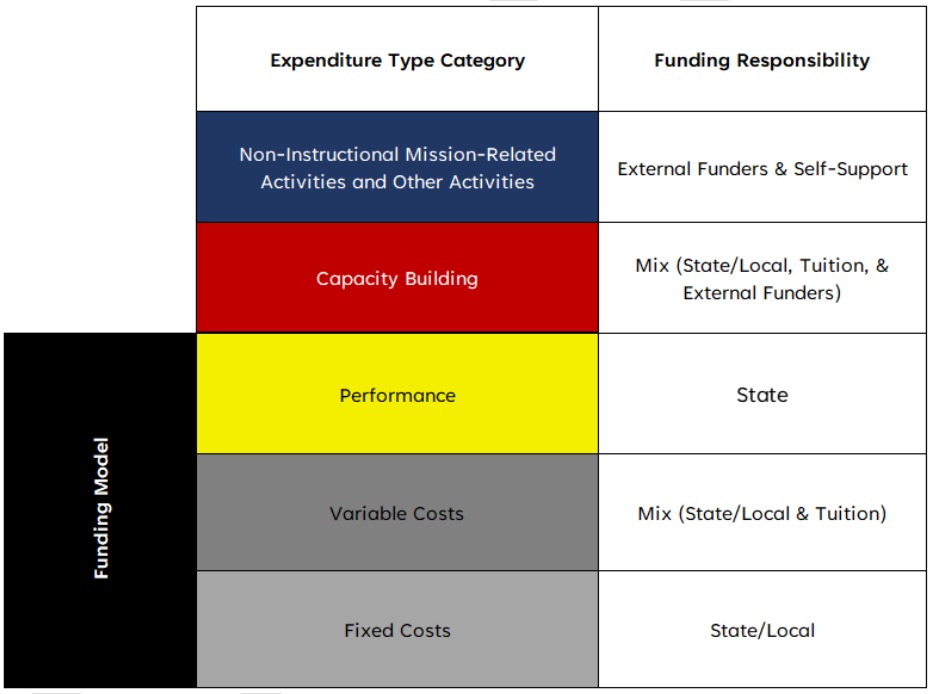
Based on this learning, NCHEMS designed a new funding model for Missouri that:

- Links institutional costs and state funding in policy and in practice.
- Recognizes that institutions vary in their missions, reflected in the programs they offer and the students they serve.
- Prioritizes the state of Missouri's responsibility to maintain its state assets, such as the maintenance of institutional facilities but also curricula that are relevant and oriented toward workforce needs and students' educational aspirations.
- Operationalizes the imperative to provide educational services to all Missourians, regardless of their background or where they live within the state.
- Rewards institutions for improvement in making contributions to the achievement of state priorities related to raising educational attainment levels, driving economic growth, operating efficiently, and ensuring educational opportunities are widely available to all.

In the report, we explain the funding components used to carry out these design principles and provide a simulation of institution-level funding results driven by the formula. But in brief, the model

accomplishes these purposes by developing total cost estimates through a straightforward conceptual framework (Figure 1). This framework suggests that there are some core foundational costs that any institution needs to "open the doors" and to preserve the value of the institution as an asset of the state (or, in the case of the community colleges in Missouri, the local taxing district). These funding requirements represent an institution's fixed costs. Next are variable costs, which are determined by the institution's overall enrollment, its mix of academic and professional programs, and the characteristics of its student population. Because different programs cost different amounts to offer, institutions' costs of instruction vary widely. This is likewise the case with different populations of students; some students need more support services than others if they are to be successful in their academic pursuits.

Figure 1. A Conceptual Framework for New Funding Model in Missouri



The fixed and variable costs together establish an adequate level of funding for each institution, while comparisons of total revenue collected relative to total costs provide an empirically based assessment of how equitably funded the state's institutions are, by sector.

Beyond the adequacy calculations is the performance component of the model. With fixed and variable costs and adequacy understood, a performance model is best equipped to drive institutional improvement in a manner reflective of the General Assembly's intent. Explicit performance metrics recommended for implementation include measures that reward institutions for improving students' academic progress, completions, alignment to workforce needs, employment outcomes, as well as operational efficiency and collaborative behavior with their institutional counterparts. In addition, performance expectations are also embedded throughout the model by

benchmarking Missouri institutions against sector-based peers nationally on achieving frugal levels of administrative and instructional operations, by removing financial barriers to the development of high-cost and workforce-relevant programs, and by counting the semester credit hours students earn rather than just those attempted.

The model also recognizes the reality that the institutions, as well as the state, will have an interest in building capacity to meet evolving workforce and enrollment demands from students. It accounts for other aspects of institutional budgets that are not generally subsidized by states.

Once an institution's total costs are estimated, the model intentionally raises the question about who bears responsibility for what share of these costs—the state, local government, or students. Throughout, this model deliberately reflects important differences between the respective missions of each public institution in Missouri.

Finally, we find that Missouri's public research universities are the among the most efficient in the nation. Missouri's public comprehensive sector outpaces much of the nation in producing graduates relative to revenue. By contrast, Missouri's public two-year institutions are slightly less efficient. As a whole, they produce awards at a lower rate—but operate with less revenue per student, than the national average. NCHEMS complemented this quantitative analysis with a survey of Missouri's postsecondary institutions, finding that they largely prioritize redeploying and reallocating resources for state and institutional priorities, and they place value on reducing administrative costs without compromising services.

The report concludes with several recommendations for stakeholders in Missouri, including ways to adopt and implement the proposed funding model. Critical recommendations to the Missouri General Assembly urge that it should:

1. Enact into statute the broad general framework for a funding model—incorporating benchmarked data about costs—as guidance to MDHEWD for its annual budget submission to the legislature.
2. Establish expectations that the model be designed using a cost-based approach in which the formula yields an estimated total amount of funding required to serve each institution's instructional mission.
3. Treat the performance component of the funding model as a crucial tool to drive improvement in student success and efficient operations that builds on a design that supports a frugal level of funding adequacy for all public institutions in an equitable manner, while recognizing that incentives to spur institutional efficiency and performance are embedded throughout the funding model, not just the performance component.
4. The legislature should direct the Department to prepare a set of recommendations regarding how costs are to be shared among the state, students and local taxing districts for consideration and adoption by the legislature.
5. The legislature should direct MDHEWD to propose a plan for implementation of a new funding model including timelines and staging (for example, the conditions for funding the

basic adequacy component of the model before funds are distributed through the performance component).

6. The legislature should recognize that there will be some modest additional costs incurred to properly administer this new funding model and to provide the necessary support to MDHEWD.
7. The legislature should direct the Missouri Coordinating Board for Higher Education and MDHEWD to ensure that role and scope designations for the public institutions are current and sufficiently descriptive to provide guidance about an institution's distinct program array, the characteristics of the students it serves, and any other special aspects of its mission (e.g., Land-grant status).
8. The legislature should direct MDHEWD to develop ideas for how Missouri might provide dedicated funding to seed and sustain productive collaborative efforts among its public institutions.

In addition, the report offers recommendations appropriate for adoption by the Coordinating Board for Higher Education and MDHEWD.

Introduction

In the 2022 legislative session, the Missouri General Assembly passed HB3003 which included a directive to the Missouri Department of Higher Education and Workforce Development (MDHEWD)—and appropriated the necessary funds for:

"Commissioning a study which provides recommendations to the Governor and General Assembly on public higher education performance funding models, considering state fiscal climate and institutional mission, to be completed by December 15, 2022; and for commissioning a study that makes recommendations to the Governor and General Assembly regarding higher education efficiency and possible reforms, considering current institutional missions and state fiscal resources to be completed by July 1, 2023."

In response to this directive, MDHEWD developed and circulated a Request for Proposals (RFP) seeking a contractor to provide a "Study on Higher Education Performance Funding and Efficiency/Reforms." The National Center for Higher Education Management Systems (NCHEMS) responded to this RFP and, after due consideration, was selected to conduct this study. The RFP specified three deliverables:

- A comprehensive work plan for the project to be submitted early in the project. This work plan was submitted and accepted in late August 2022. It can be viewed on the MDHEWD website at https://dhewd.mo.gov/about/legislative/HigherEducationFundingStudy.php.
- A review of performance funding models and recommendations for implementing such a model in Missouri. This review is expected to cover both the national perspective—implementation in other states—and the history of performance funding in Missouri.
- A review of higher education efficiency, and recommendations regarding possible reforms.

This document includes both the performance funding and efficiency components of the final product.

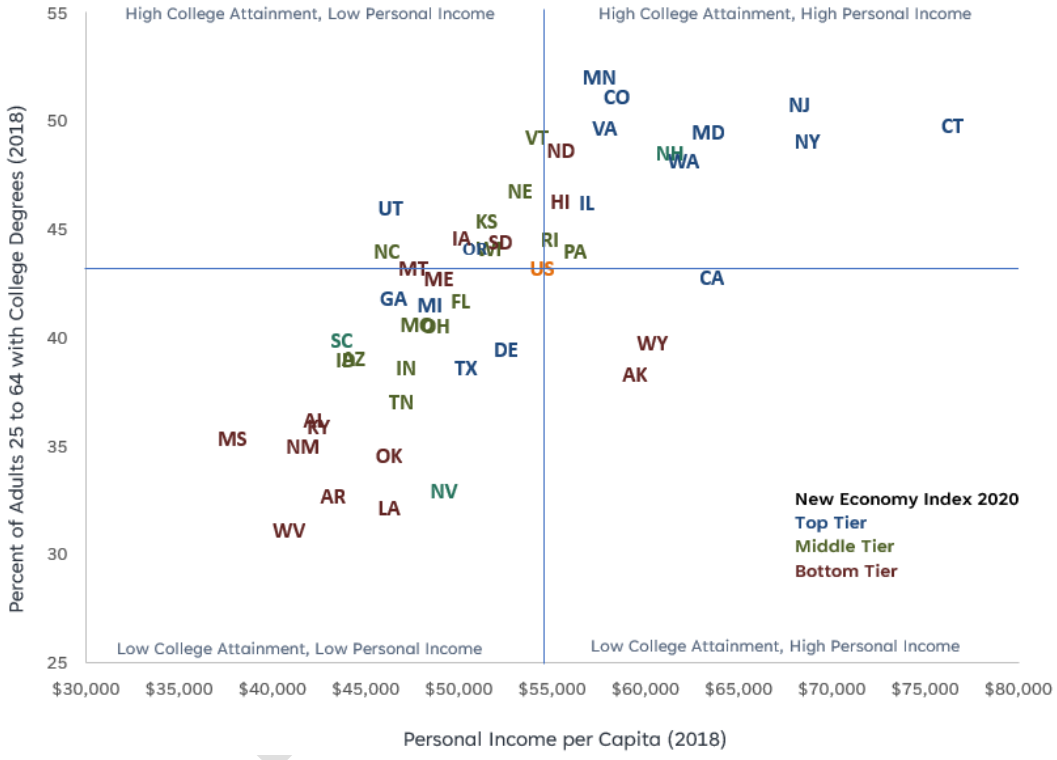
Background

In order to be most effective, the project's activities were shaped intentionally with the state's higher education strategic plan in mind. That plan, *Building Missouri's Future,* was adopted by the Missouri Coordinating Board for Higher Education in December 2021.[1] It sets goals for the state (and the agency) to achieve the Midwest's best educational attainment and workforce participation rates and, in the process of reaching those goals, to increase enrollment and completion numbers and rates, reduce barriers to college affordability, boost employment, and to close gaps in college and labor force participation.

[1] https://dhewd.mo.gov/documents/StrategicPlan2021.pdf

Underlying the plan is the understanding that Missouri's future economy requires an increase in educational attainment.[2] The plan notes that, “Demand for workers with some form of postsecondary credential remains higher than the number of Missourians with those credentials” and that, “A skilled, prepared, and motivated workforce is necessary to attract and retain businesses in Missouri.” A wealth of research supports these claims. Figure 2 shows the relationship between educational attainment and both personal income and the state economy. States in the top tier of the State New Economy Index—which measures the extent to which state economies are knowledge-based, globalized, entrepreneurial, IT-driven, and innovation-oriented—are overwhelmingly those with both high educational attainment and high personal income. Currently, Missouri's personal income and educational attainment are both slightly below average compared to other states, and it ranks 25th on the State New Economy Index.

Figure 2. The Relationship Between Educational Attainment, Personal Income, and the State New Economy Index



Source: U.S. Census Bureau, American Community Survey; Bureau of Economic Analysis; ITIF

Missouri leaders have recognized these realities. In 2011, the state set its "big goal" for higher education, which is for 60 percent of working-age adults (ages 25-64) in Missouri to have a

[2] Worth noting is that higher educational attainment levels are also linked to other social goods such as improved health (and reduced health care costs), higher voting and charitable giving rates, and so on.

certificate or degree by 2025. In more recent years, the Missouri legislature has funded the FastTrack and MoExcels programs, both of which are designed to help address workforce needs through higher education.

Although Missouri has been making progress towards its goals, the state's ability to reach the goals in the *Building Missouri's Future* plan will be affected by an increasingly challenging environment for postsecondary education in the state and across the nation. Most crucially, Missouri and other states can anticipate a decline in the number of students graduating from high school. As the traditional pipeline of college enrollment narrows, Missouri's institutions will increasingly feel the pressure of competition from each other and from independent and out-of-state institutions seeking to keep their entering classes as full as possible. In addition to seeing declines in the number of prospective students emerging from high school, those that do are sure to be more racially and ethnically diverse. These students will come to college with different needs. On average, they will be more likely to be the first in their family to enroll at college; they will be able to count on fewer family financial resources to help them afford college; and they may have experienced a less rigorous academic preparation for college. Shrinking sizes of high school graduating classes, together with heightened workforce demand for postsecondary education (of all kinds, not just bachelor's degrees), will compel institutions to look for ways to more effectively serve adult learners, as well. As these changes wash over higher education, institutions will have to change their perspectives on who they must serve, what programs and services they offer, and the ways in which they deliver those programs and services if they are to remain relevant and essential to the state and to its regions and communities.

This project takes place against the backdrop of these conditions. In order to ensure that Missouri's public institutions are most capable of making these shifts, the project is the combination of two overlapping studies—one that addresses public higher education funding with an emphasis on institutional performance, and one that focuses on boosting efficiency among institutions. The charge to NCHEMS was to craft a final report that puts forward recommendations aimed at helping the state reach its strategic planning goals through a funding policy designed to incentivize institutions to prioritize those goals, and, at the same time, to provide predictable support that meaningfully reflects the important differences in institutional mission—the different programs they offer to the different student populations they enroll. In addition, the report should include recommendations that ensure that institutions relentlessly seek efficiency improvements in their own operations, as well as recommendations to help MDHEWD and state policymakers coordinate state investments in ways that efficiently meet the needs of the state, its regions, and its students.

Immediately upon contract execution, NCHEMS and MDHEWD held an initial meeting that resulted in a more complete understanding of the project's scope, particularly with respect to the performance funding component of the study. As described in the first report NCHEMS produced for this project, the RFP was written with the narrow focus on performance funding, but it was ambiguous as to specific intent, namely whether the study was intended to:

- develop a new model to allocate 100 percent of the total state appropriation to public institutions, in which all or some portion would be based on performance, or
- develop a performance funding model that allocates some portion of state appropriations but otherwise does not address the allocation of funding that is not based on performance.

NCHEMS' experience is that it is very difficult to successfully implement performance funding when the underlying base funding allocation cannot be demonstrated as being "fair." Institutions that are disadvantaged in base funding will argue (probably legitimately) that they are disadvantaged in producing the outcomes that are rewarded in the model. Inequities in the resources institutions have to support the production of desired outcomes will increase over time if historical disadvantages in base funding are not addressed. For example, Illinois allocates a meager level of funding for performance in part because institutions with relatively less funding per student believed that existing inequity in their base allocations needed to be addressed first. By contrast, Tennessee was able to adopt its far-ranging performance funding model in part because it operated a base funding approach that was less imbalanced before the changes were implemented, and it continues to maintain a commitment to supporting base funding within its current policy. After discussions with MDHEWD staff and members of the legislature, it became clear that a study of the allocation of all state appropriations to institutions was necessary, and that the resulting model should be rational and strategic, include provisions that incentivize institutional performance, and be implemented over a period of time long enough to make a smooth transition to a new model possible.

The meeting also provided NCHEMS and MDHEWD an opportunity to refine the activities to be undertaken, develop a means by which stakeholders could be engaged to provide input to NCHEMS, and the corresponding schedule. To create a means to gather input from key stakeholders, including institutional leaders and legislators, MDHEWD recruited an Advisory Committee. Members from institutions were selected to provide adequate representation of Missouri's geographic regions and institutional sectors, and the membership of the advisory group was vetted by legislators and institutional presidents during a subsequent conference call.

With respect to the project timeline, the requirement to consider the full allocation of state funding to public institutions necessitated a lengthier timeline. Thus, instead of producing recommendations for a new performance funding model in December 2022 and a second report to address efficiency reforms to be completed by June 2023, NCHEMS, MDHEWD, and key legislators agreed to require a focused report on Missouri's existing funding approach and performance funding practices by December 2022, to be followed in June 2023 by this full report with recommendations for a new funding model and efficiency reforms.

This report first describes the data and methods used throughout the project. Next it highlights key findings that will inform recommendations and summarizes them. Finally, it presents a framework for public funding of postsecondary institutions and offers recommendations for the design and implementation of a funding model built on that framework. Recommendations for improved efficiency are also provided. Where appropriate, the report will reproduce or refer to content from

the December 2022 initial report. Appendices provide data and information that can be useful for providing additional context and insights.

Data and Methods

To conduct the study of public funding, NCHEMS first consulted available research on public funding of higher education institutions. Our research included reports and analyses of Missouri funding trends available from MDHEWD as well as our own analyses of publicly available data. Working with MDHEWD, NCHEMS also prepared an extensive request for publicly unavailable data for use in analyses and to populate a funding model. Whenever possible, MDHEWD supplied data directly, and as necessary its staff worked with the institutions to gather additional data elements to fulfill the request.

Due to the shift in our approach from a focus solely on a performance funding model as a stand-alone policy to one that accounts for all of the state's appropriations for higher education, of which performance funding is expected to be an important component, NCHEMS adapted a conceptual framework for public higher education funding that it has developed for use by other states.[3] NCHEMS reviewed the framework with MDHEWD staff, key legislators, and the Advisory Committee at an initial meeting in October, and continued to gather input on elements of the framework and the performance funding component in particular, during regular monthly meetings.

Using both publicly available data and data provided by MDHEWD or the institutions, NCHEMS constructed and populated a funding model designed to operationalize the framework. The model is capable of simulating the results produced by the model under different scenarios; in other words, investigating the results using different values for technical or policy parameters in the model. NCHEMS used this tool to identify a preliminary set of parameters for use in prompting feedback from the Advisory Committee and individual institutions.

For the efficiency reform part of the project, NCHEMS also collected publicly available data and data from MDHEWD to analyze enrollment trends, productivity, and programming of Missouri's institutions. In addition, NCHEMS conducted two surveys to assess state and institutional efforts to promote efficient operations at institutions and, in a coordinated fashion, at the state level. The first of these surveys was a partnership with the State Higher Education Executive Officers national membership association (SHEEO). The survey was fielded to the chief executives of all SHEEO offices with the goal of gathering information about the role that SHEEO members across the country play with respect to promoting efficient operations, particularly with respect to what policies or practices

[3] Papers, articles, and reports that describe the model include: Prescott, B., Koch, Z., & Jones, D. (2021). *Considering a Standard Approach to Defining Institutional Funding Adequacy*. Paper prepared for SHEEO's "Public Investment in Higher Education: Research, Strategies, and Policy Implications" Series. https://sheeo.org/wp-content/uploads/2021/06/210407-Institutional-Adequacy-Paper-FINAL.pdf; Koch, Z. & Prescott, B.T. (2021). "Adequately Funding Postsecondary Institutions as State Assets," *Change: The Magazine of Higher Learning,* 53:5, pp 56-64; NCHEMS & SCHEV (2022). *Virginia Cost and Funding Need Study Final Report*. www.schev.edu/coststudy.

they used to do so. The second survey was a detailed request of Missouri's institutions to document their activities and initiatives designed to increase efficiency and effectiveness. In addition to asking institutions to document specific steps they have taken, the survey also sought to understand institutions' priorities related to how they are reallocating savings they generate from their efforts to improve operational efficiency.

In April 2023, NCHEMS conducted twin tours of Missouri, each with two NCHEMS' staff members—one pair visited campuses mostly on the western side of the state and the other on the eastern side. For each of four days, two public institutions in the state hosted the NCHEMS teams and colleagues from institutions nearby.[4] Invitations went to all the presidents, who in most cases were able to attend a meeting with their principal leadership team (or a subset of that group). Meetings were organized to feature morning discussions among all participants that were informed by a select set of data exhibits, including a preliminary look at modeling results presented by sector. The agenda included time for discussion of both the performance funding model as well as how institutions are trying to generate efficiencies while also meeting local and statewide needs, executing on their strategic plans related to program development and student recruitment and success, and collaborating to deliver services in partnership with other institutions. Lunch was followed by separate conversations with individual institutions to allow each one to share any particularly sensitive feedback.

These campus visits were extremely informative and, based on the feedback received, NCHEMS made adjustments to the initial funding model and to our preliminary thinking about efficiency reform. The resulting recommendations have benefited from these interactions with stakeholders. But, in keeping with the project intent that NCHEMS make its best recommendations without seeking consensus among stakeholders, it should not be inferred that institutions have endorsed this report or its recommendations.

Existing Research on Higher Education Funding Approaches

Nationally, states have been taking a close look at their approaches to funding public higher education in recent years. In most cases, reforms have been to add a performance funding component to their existing funding models. By FY 2021, 31 states had performance funding in place in at least one sector, with more states in the process of developing such models.[5] An additional five states, including Missouri, had a performance funding approach on the books, but were not allocating any funds using this approach.

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[4] NCHEMS appreciates the special efforts of institutions to host our visits and their colleagues, the willingness of institutional leaders who traveled to the host site, and the efforts by MDHEWD to help organize and communicate with the institutions in the run-up to our visits.

[5] Snyder, M., Boelscher, S., & Zaragoza, D. (2020). *Driving Better Outcomes.* https://static1.squarespace.com/static/62bdd1bbd6b48a2f0f75d310/t/6388d5843e498f0edceb98c1/1669911943879/DRIVING-BETTER-Outcomes-Fiscal-Year-2020-State-Status-Typology-Update.pdf.

The first report delivered by NCHEMS in December 2022 provided an overview of the research on performance funding models in use by states, as well as outlined details about the approaches in use in several other states. The principal takeaways from that work were that:

- Performance funding approaches have mixed results when it comes to achieving their goals. Of particular concern is that poorly designed approaches can lead to perverse incentives that yield larger gaps in student success for populations already underserved in higher education such as students from low-income, underrepresented, and rural backgrounds and for adult learners. At a minimum, designs that are based on improving rates—such as graduation rates rather than graduation numbers—can encourage gaming the denominator and are not closely tied to state goals related to increasing the number of degrees; those that fail to explicitly provide clear incentives to serve target populations make attainment gaps worse.
- Performance funding models that are appended to existing state allocation policies that are fundamentally inequitable are unlikely to have the intended impact, and they may exacerbate conditions that limit the educational capacity and performance of poorly funded institutions—likely those that disproportionately serve target populations.
- Most states' performance funding approach allocates funding from a fixed pool. Although sensible from a state budgeting perspective, this can undermine the very intent of the policy when institutions that improve their performance wind up *losing* funding if their neighbors show relatively greater improvement. These results severely undercut the incentive value of performance funding; institutions quit trying when improvement goes unrewarded. Such an approach also supercharges competition among institutions that is unproductive because it obliterates any incentives to seek partnerships among them that would better serve students or their respective communities.
- It is unwise to adopt wholesale the performance funding policies of another state (this is also true of other policy domains); instead, Missouri's performance funding approach should align with its strategic priorities and mesh with the approach it takes to funding its institutions generally as well as with policies relating to tuition-setting and financial aid.[6]

Despite the wide adoption of performance funding, few states implementing these approaches are using them to direct large shares of their appropriations. Instead, these models are layered on top of funding that flows from the state to institutions primarily based on historic allocations or on some formula that is mainly driven by enrollment levels. Far less research has been done on these "base" or "core" funding approaches than has been devoted to performance funding, although this is changing. Recent research has updated the picture of how states are providing the bulk of their

[6] Jones, D., Mortimer, K. P., Brinkman, P. T., Lingenfelter, P. E., L'Orange, H. P., Rasmussen, C., & Voorhees, R. A. (2003). *Policies in Sync: Appropriations, Tuition, and Financial Aid for Higher Education.* (Boulder, CO: Western Interstate Commission for Higher Education). https://www.wiche.edu/wp-content/uploads/2020/12/PoliciesInSync.pdf.

funding to public institutions while also highlighting the importance of that funding and the consequences of decisions to enhance or reduce base funding levels.

For starters, research is clear that states overwhelmingly rely, at least in part, on "Base-Plus" funding approaches.[7] Base-Plus funding is essentially the same as incremental funding—approaches in which states simply make an across-the-board percentage adjustment (up or down) to each institution's appropriation's current appropriation to determine the allotment for the subsequent year. This approach is easy to budget for and can appear to be reasonably connected to major cost drivers like inflation, employee salaries and benefits (often controlled, at least in part, by the state), and so on. However, this approach fails to recognize changes in the scale and scope of educational services being provided and in the changing nature of the student bodies being served.

Another common approach is for states to use a formula to inform how much they appropriate to higher education institutions. This at least has the virtue of being responsive to shifts in enrollment that have obvious implications for the costs institutions face. But it is little different from tuition funding in the sense that enrollment-based formulas reinforce existing incentives for institutions to recruit more students in order to attract more funding. In so doing, they fail to fully account for how costs actually mount for institutions.

Whatever approach states use to allocate funds to their public institutions, it is beyond a doubt that state appropriations have a significant effect on the behavior of institutions and to student outcomes and affordability. First, it is readily apparent that states routinely fail to appropriate funds on the basis of demand. In fact, they do the opposite, using higher education funding as the so-called "balance wheel" of state budgeting, cutting funding when economic times are tough and (partially) restoring funding when the economy improves in a pattern that is almost precisely opposite of enrollment patterns.[8] Consequently, during times in which institutional costs are rising, state funding is reduced.

Second, state appropriations can be powerful tools to encourage higher enrollment levels, better student outcomes, and improved affordability if the approach to their allocation is well designed. They can be especially powerful in driving improvements at institutions that disproportionately serve target populations.[9]

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[7] Laderman, S., McNamara, D., Prescott, B., Torres Lugo, S., & Weeden, D. (2022). *State Approaches to Base Funding for Public Colleges and Universities.* (Boulder, CO: State Higher Education Executive Officers). https://sheeo.org/wp-content/uploads/2022/10/SHEEO_2022_State_Approaches_Base_Funding.pdf; Lingo, M., Kelchen, R., Rosinger, K., Baker, D., Ortagus, J., & Wu, J. (2023). *The Landscape of State Funding Formulas for Public Colleges and Universities.* *https://static1.squarespace.com/static/5d9f9fae6a122515ee074363/t/6446df7a981da30ef202a70c/1682366330568/ISBrief_TheLandscapeofStateFundingFormulas_PublicCollegesUniversities_April2023.pdf*.

[8] Delaney, J. A., & Doyle, W. R. (2011). State spending on higher education: Testing the balance wheel over time. *Journal of Education Finance*, 36(4), 343-368.

[9] Cummings, K., Laderman, S., Lee, J., Tandberg, D., & Weeden, D. (2021). *Investigating the Impacts of State Higher Education Appropriations and Financial Aid.* https://sheeo.org/wp-content/uploads/2021/05/SHEEO_ImpactAppropationsFinancialAid.pdf.

Third, while state appropriations are key components of institutional funding, the overall state approach to higher education funding—an approach that encompasses policy on tuition levels and funding for student financial aid—is seldom well articulated.[10]

Fourth, institutional responses to changes in state appropriations are not uniform. Those that can—often the state flagship and other research universities—respond to cuts in state appropriations by expanding their recruitment of out-of-state students (or dipping deeper into their applicant pool thus further reducing enrollments at other public institutions). This allows them to generate discretionary revenue that replaces losses in state funding, and may induce them to enroll fewer students from target populations. Those institutions without the option of expanded recruitment are forced to reduce costs by cutting student support services and eliminating programs, thereby reducing their competitiveness and performance.[11]

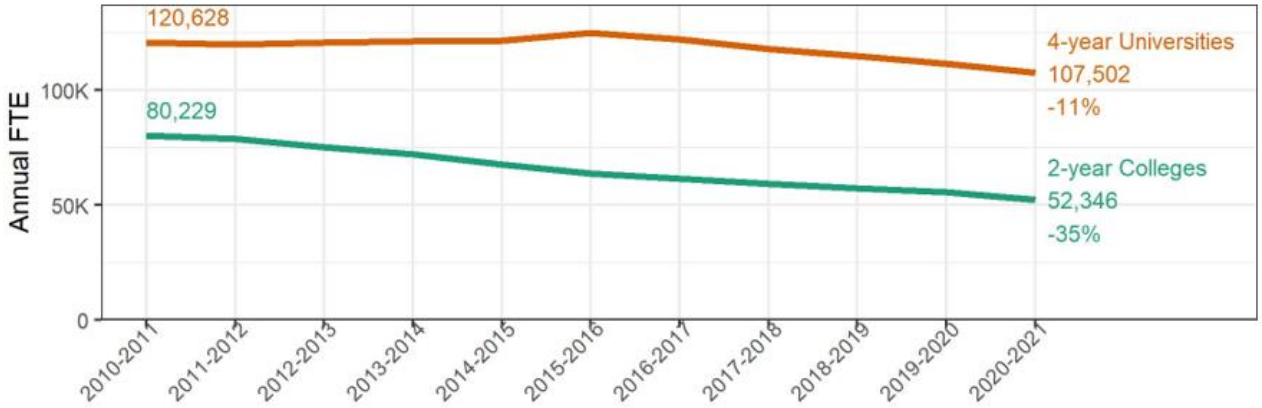
Higher Education Funding in Missouri

Missouri is among the states that has used a Base-Plus approach, one that (we were told) established the "Base" part of "Base-Plus" sometime in the mid-1990s. Since then, funding to the state's public institutions has been the result of incremental decisions that have done little to account for how the institutions have changed relative to one another in ways that affect costs. Over time, institutions themselves have recognized the creeping inequity that has resulted in their funding and both the community colleges and the four-year institutions have sought to implement modest fixes through negotiated reallocations of new funding amongst themselves. As recently as 2019, NCHEMS conducted a study of institutional funding in Missouri that highlighted serious inequity.[12]

Regardless of the funding approach, a critical first look at higher education finances is to review how enrollment has changed over time. In Missouri, both the two- and four-year sectors have seen significant decline in FTE enrollment during the last decade (Figure 3). For two-year institutions collectively, declines have been consistent since (at least) 2010-11, falling 35 percent over that period. The four-year sector experienced enrollment stability from 2010-11 through 2015-16, but has since seen enrollments slump.

[10] Jones, D., Mortimer, K. P., Brinkman, P. T., Lingenfelter, P. E., L'Orange, H. P., Rasmussen, C., & Voorhees, R. A. (2003). *Policies in Sync: Appropriations, Tuition, and Financial Aid for Higher Education.* (Boulder, CO: Western Interstate Commission for Higher Education). https://www.wiche.edu/wp-content/uploads/2020/12/PoliciesInSync.pdf.
[11] Ibid.
[12] NCHEMS (2019). *A Review of Per-Student Funding at Missouri Public Institutions.* Report produced for the Missouri Department of Higher Education. Table 5.

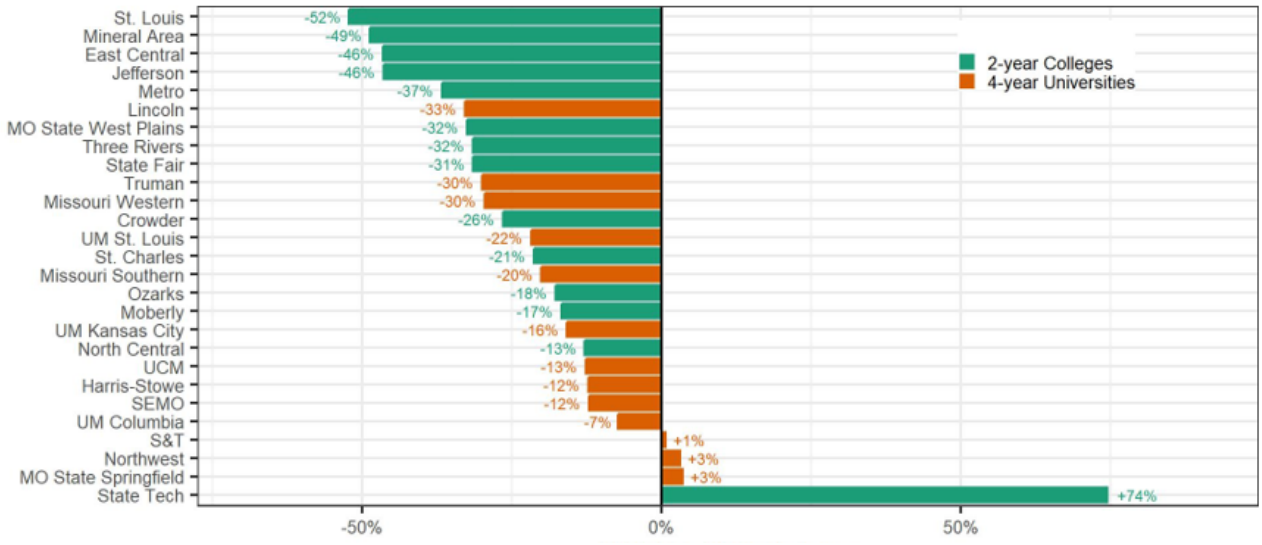
Figure 3. Total FTE Enrollment at Missouri Public Institutions by Sector, FY 2011-2021



Source: NCES IPEDS

This sector-wide picture obscures some important variability that has occurred among institutions (Figure 4). All but four institutions saw total FTE enrollment fall in the past decade, with two-year institutions most heavily impacted. By contrast, State Tech had the most substantial growth, with FTEs rising by 74 percent, a likely byproduct of its shift in mission that occurred in 2014. These figures cover one-and-a-half academic years that were impacted by the pandemic, which accelerated enrollment declines at all but State Tech and UM-Columbia.

Figure 4. Percent Change in Total FTE, 2010-11 to 2020-21

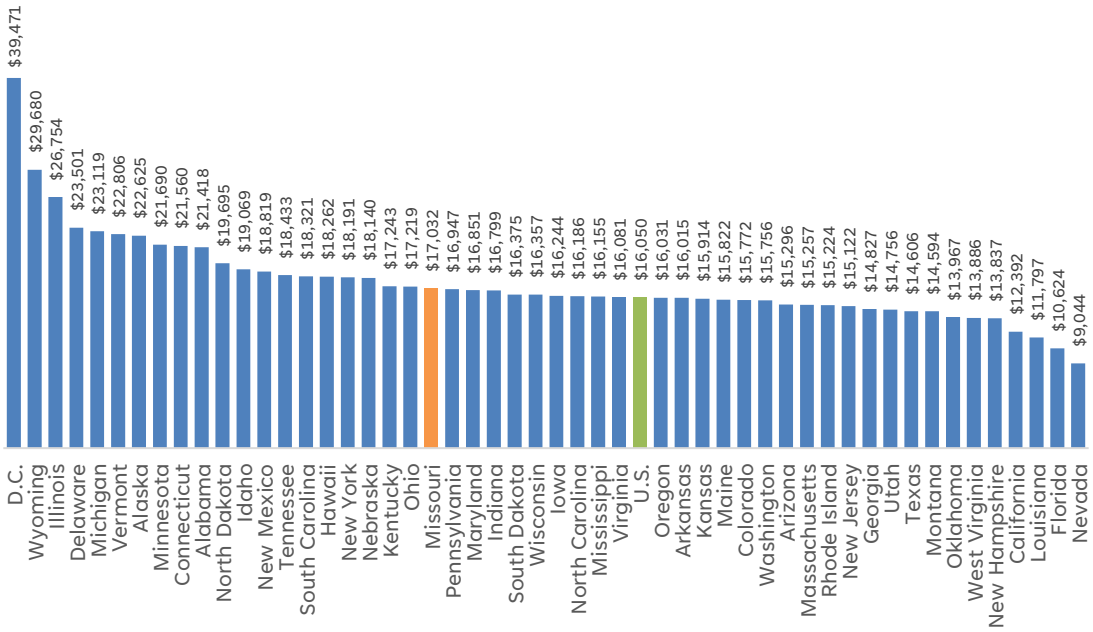


Source: NCES IPEDS

Overall, funding for higher education in Missouri—including institutional support, state-funded financial aid, and net tuition revenue—is slightly above the national average (Figure 5). Excluding

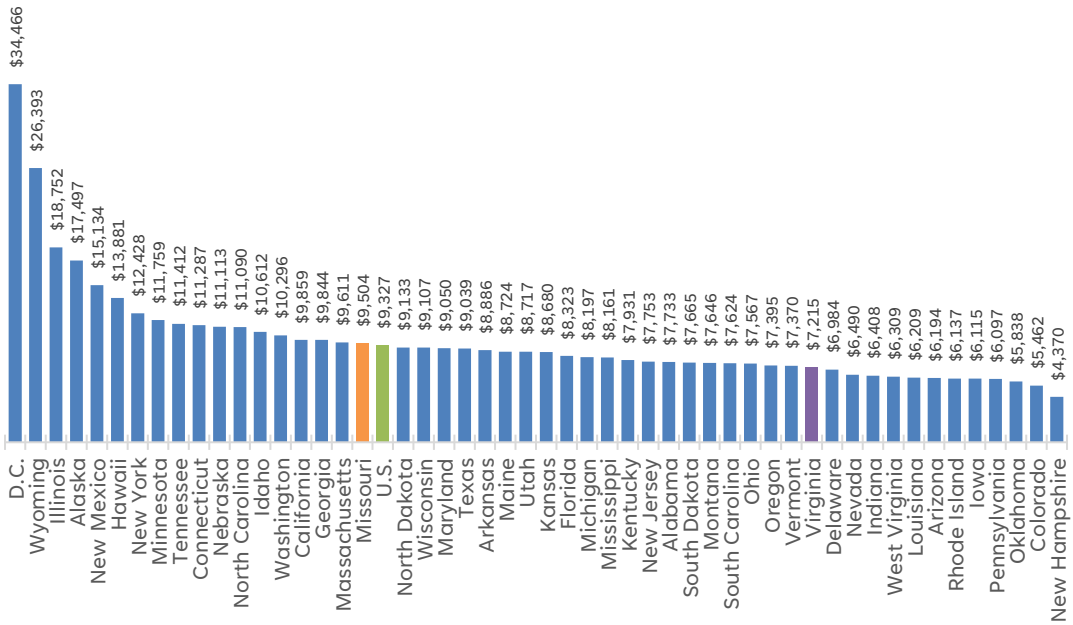
net tuition revenue puts Missouri almost squarely at the national average in educational appropriations per FTE (Figure 6).

Figure 5. Total Educational Revenue per FTE, FY 2021



Source: SHEEO SHEF

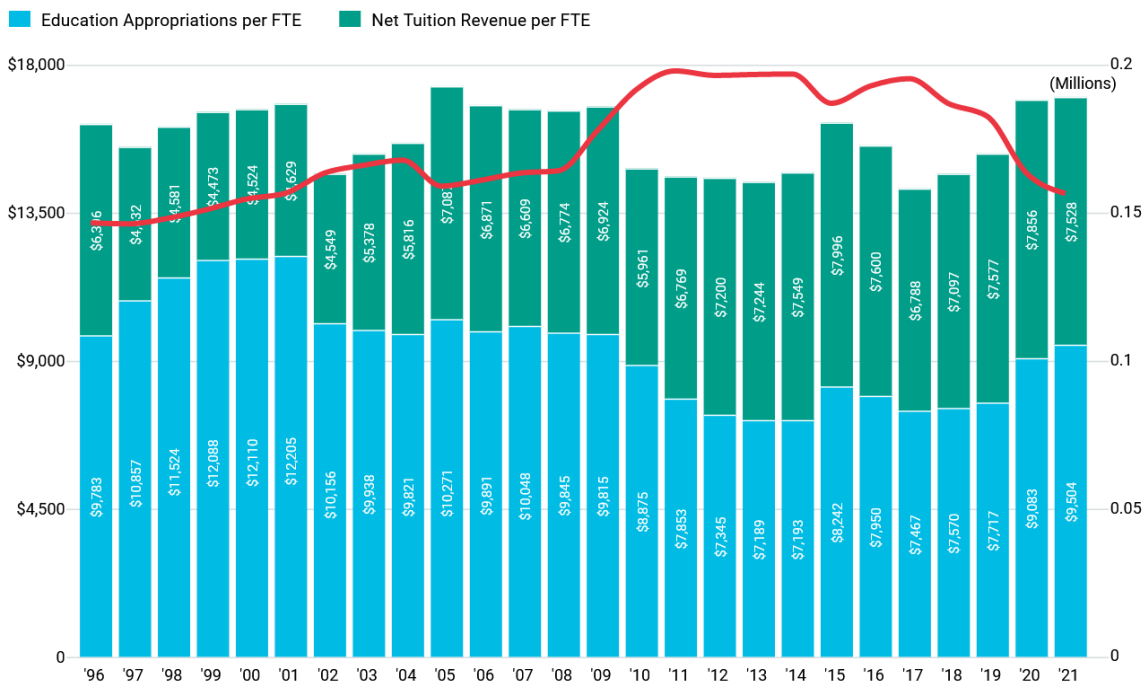
Figure 6. General Fund Educational Appropriations per FTE, FY2021



Source: SHEEO SHEF

Even though one of the virtues of Base-Plus funding approaches is its relative predictability, that should not imply funding stability. As in other states, Missouri's public institutions have seen their funding fluctuate substantially over time. Much of that volatility can be traced to enrollment patterns—the sharp increase in funding per student in recent years is due large part to declining enrollment, especially in the two-year sector (Figure 7).

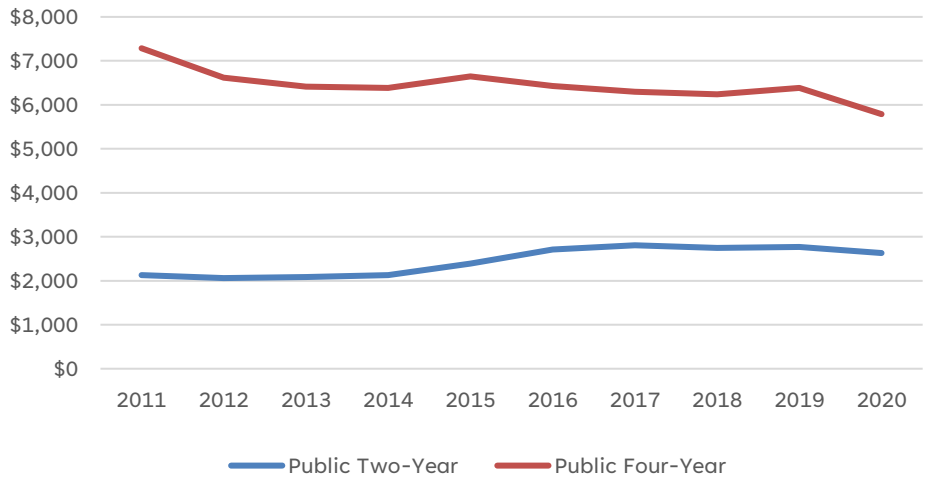
Figure 7. Educational Appropriations, Net Tuition Revenue, and FTE Enrollment in Public Institutions in Missouri



Note: Data are adjusted for inflation by CPI, enrollment mix, and cost-of-living.
Source: SHEEO SHEF.

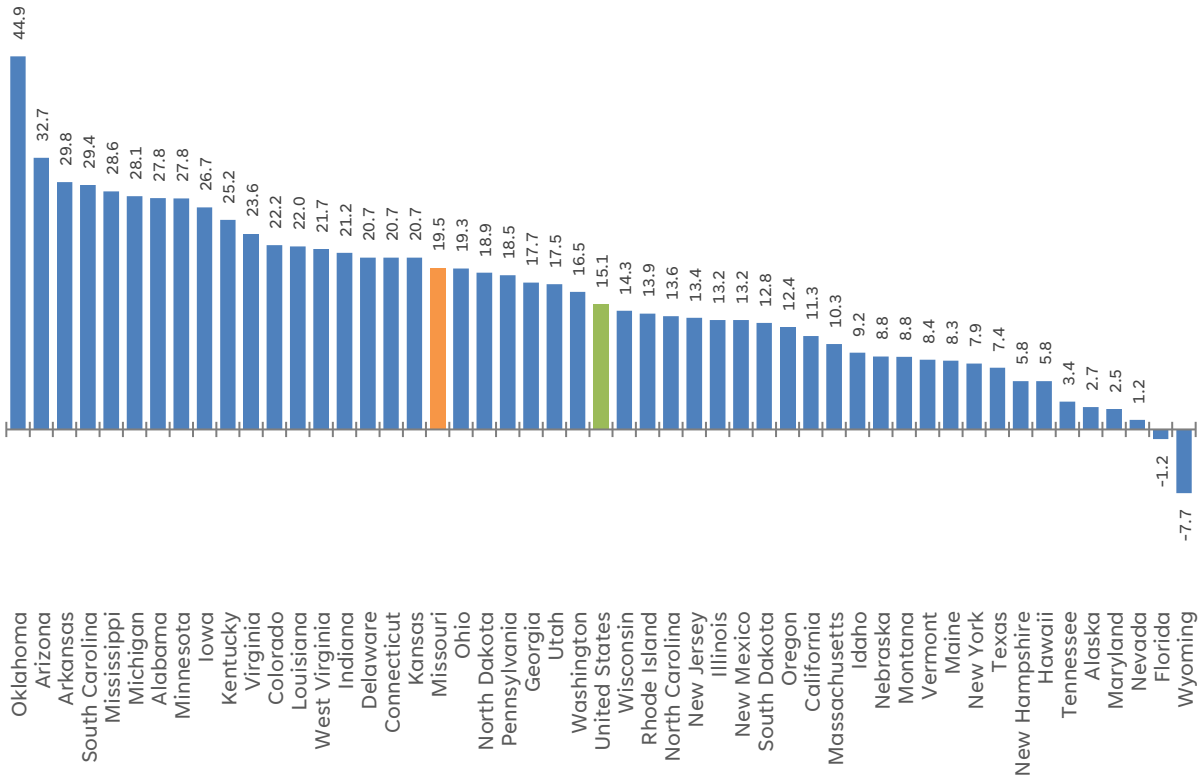
State appropriations per student directed to public institutions fell in the first half of the last decade in the public four-year sector, and they continue to fall though at a less rapid pace. In the two-year sector, appropriations per student rose between FY 2014 and 2017 but otherwise were relatively flat (Figure 8). Overall declines in state funding have helped contribute to increases in the share of total educational revenue provided by students and their families, which has outpaced the nation's rate of growth in the student share (Figure 9).

Figure 8. State Appropriations per FTE by Sector in Missouri, FY 2011-2020



Note: Data are adjusted for inflation with the CPI.
Source: NCES IPEDS.

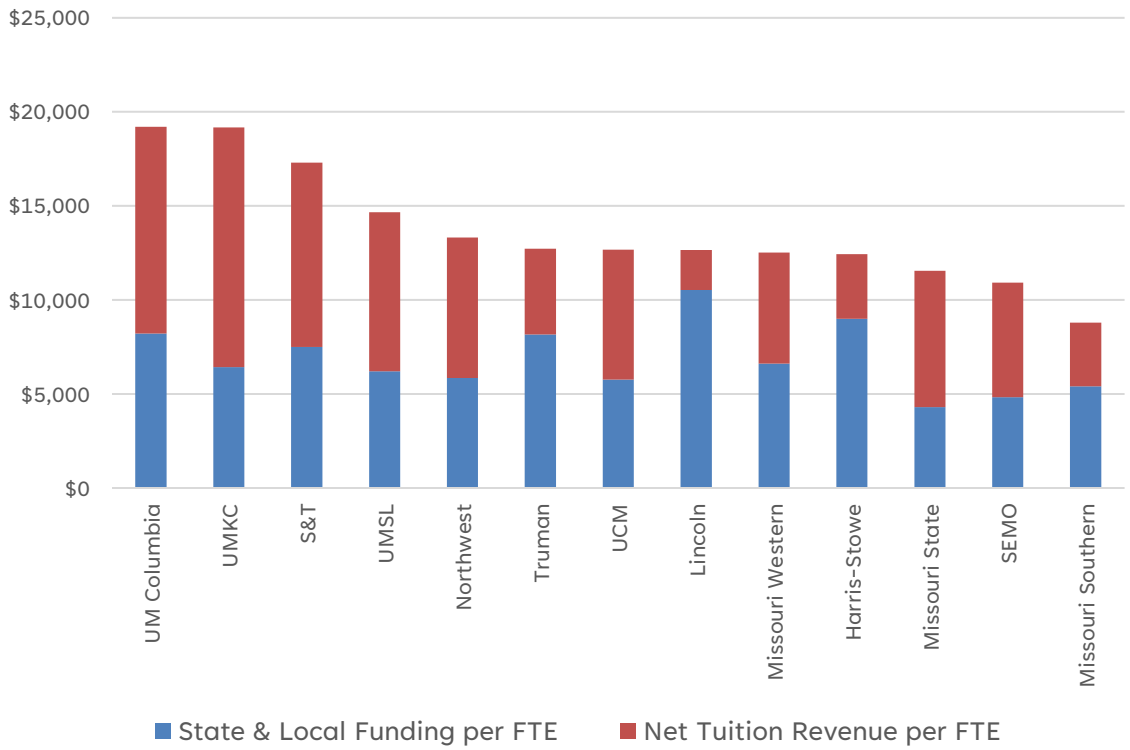
Figure 9. Change (in Percentage Points) in the Student Share of Total Educational Revenue, FY2000-2020



Source: SHEEO SHEF

Potential issues with the funding approach are revealed by looking at the main sources of discretionary revenue for Missouri's institutions. This comparison illustrates substantial variation in total revenues and indicates how widely different institutions are in their dependence on state funding. Among four-year institutions, the constituent institutions of the University of Missouri are the best funded relative to their enrollment, in large part due to their ability to attract tuition revenue (Figure 10). At the other end of the spectrum, the two HBCUs are deeply dependent on state funding.

Figure 10. State & Local Funding and Net Tuition Revenue per FTE, Missouri's Four-Year Institutions, FY 2021

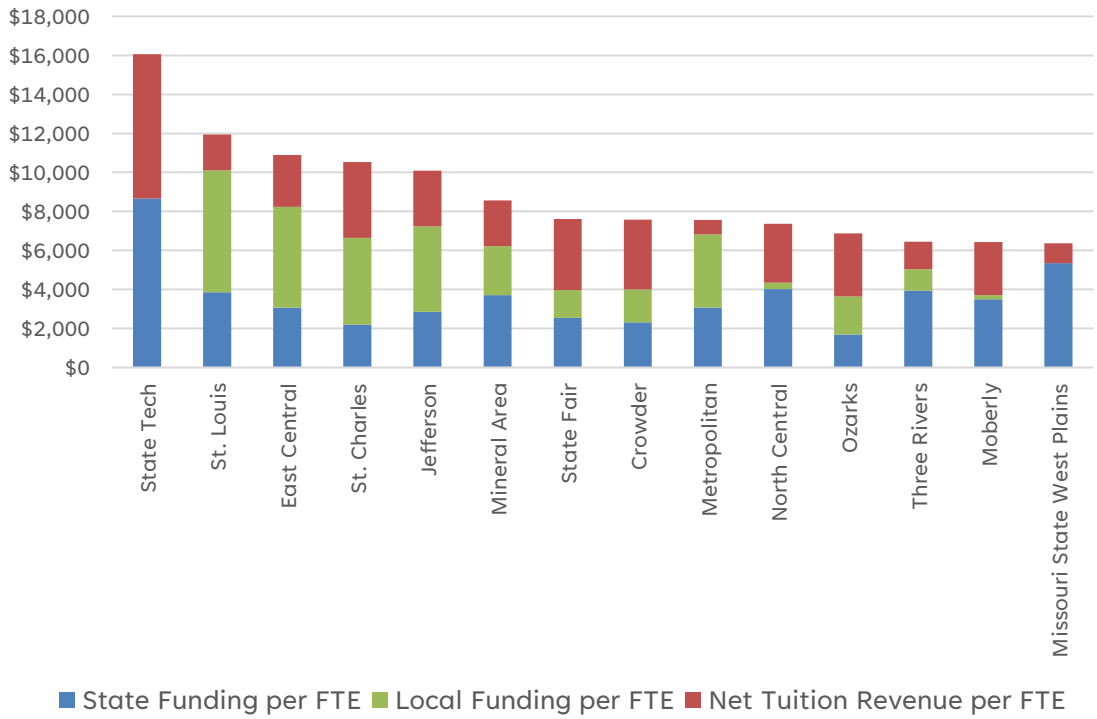


Source: NCES IPEDS

In the two-year sector, where local appropriations play a critical role in covering the costs of institutional operations, there is wide variation in how much state funding each institutions receives, a variation that is not obviously related to how much support they get from local appropriations (Figure 11). For example, Metropolitan Community College, Crowder College, and North Central Missouri College generated roughly equivalent total revenue per student in FY 2021. But how they get their money is starkly different. Nearly all of Metropolitan's funding came from state and local sources; tuition revenue plays only a very small part in its institutional budget. By contrast, students attending Crowder and North Central provided 47 and 41 percent, respectively, of total educational funding. The remaining revenue at Crowder is approximately 60 percent from the state and 40

percent from local sources; at North Central local funding plays hardly any role, accounting for just seven percent of the non-tuition support.

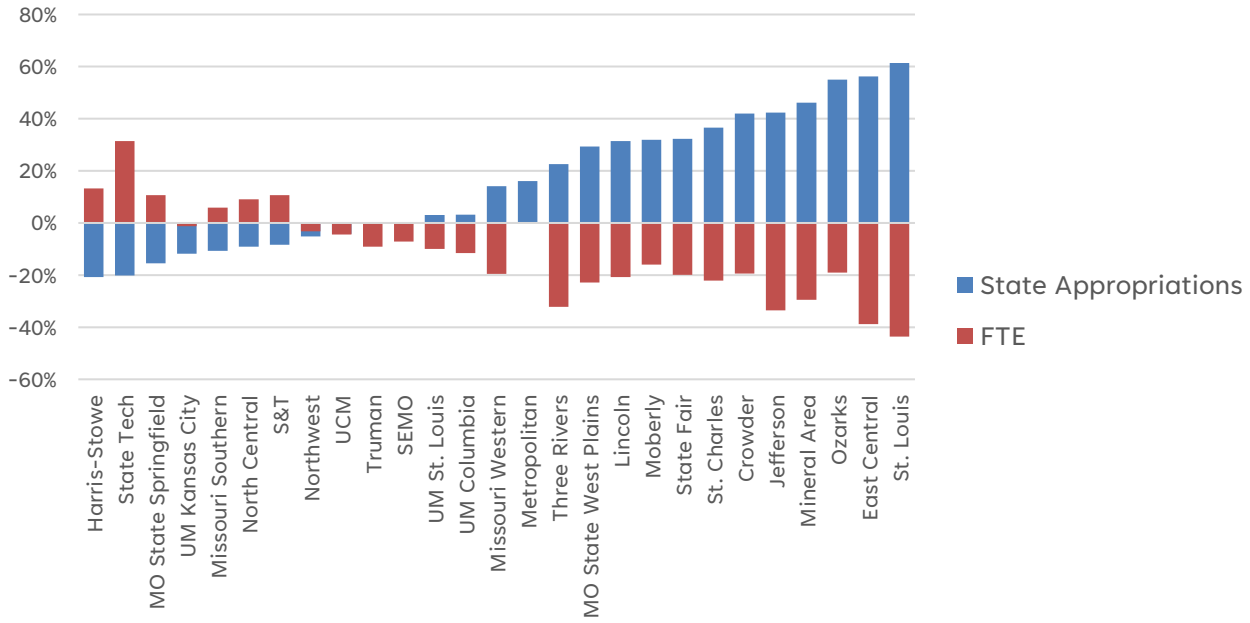
Figure 11. State Appropriations, Local Appropriations, and Net Tuition Revenue per FTE, Missouri's Two-Year Institutions, FY 2021



Source: NCES IPEDS

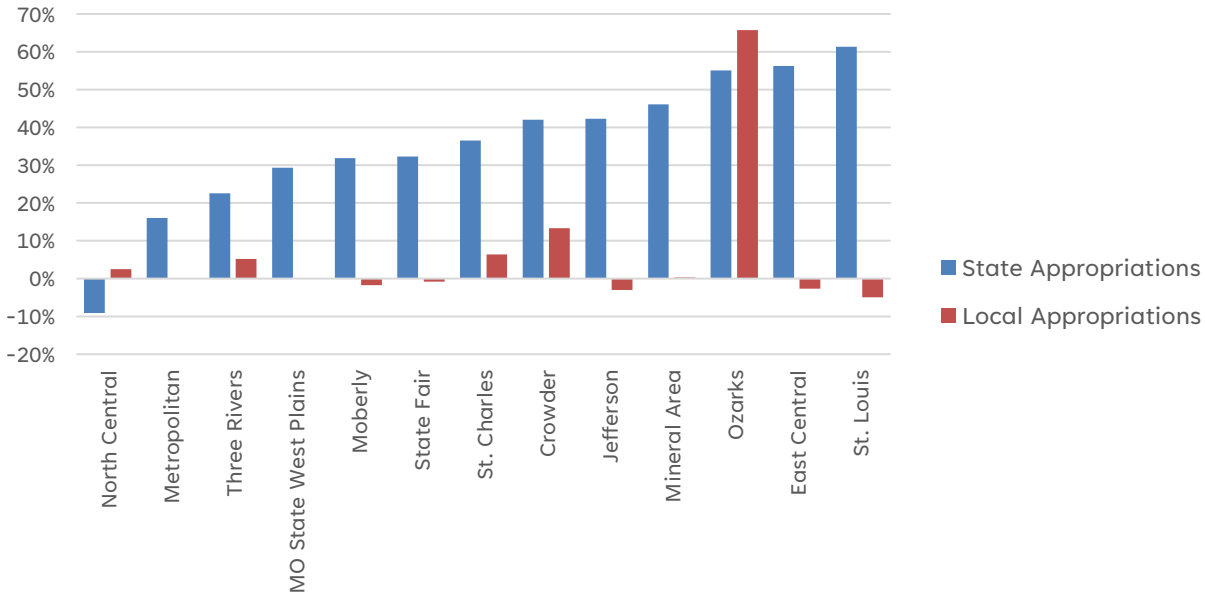
Furthermore, analyzing how changes in state funding have compared with enrollment over the past decade shows a very close inverse relationship between enrollment levels and funding (Figure 12). This suggests that Missouri's Base-Plus funding approach has helped insulate institutions from enrollment volatility. To an important degree, that is valuable as it assures institutions some predictability as their enrollment levels fluctuate. Yet the state's funding approach should be responsive to those changes on the margin to ensure that growing institutions have support sufficient to their expanding needs, as well as adjusting funding for institutions experiencing the opposite circumstance. Moreover, it is difficult to discern a clear pattern that explains how changes in the funding that comes from the state interacts with the availability of local funding (Figure 13), as it so often does in states like Missouri where community colleges are primarily locally owned and governed institutions. This suggests that the state lacks a coherent approach to how its funding should complement local funding in the community college sector in order to accomplish state priorities.

Figure 12. Percent Change in State Appropriations per FTE and FTE Enrollment by Institution, FY 2012-2019



Note: Data are adjusted for inflation using the CPI.
Source: NCES IPEDS.

Figure 13. Percent Change in State and Local Appropriations, Missouri's Two-Year Institutions, FY 2012-2020



Note: The large increase in local appropriations for Ozarks Technical Community College appears to be a function of a bond issuance for capital construction, not additional funding for operations. Data are adjusted for inflation using the CPI.
Source: NCES IPEDS.

All these shortcomings can be overcome by a well-designed funding model, one that also addresses the needs of institutions for sufficient predictability in funding that supports rational planning while also creating clear incentives to link institutional performance to state goals.

Principles Guiding the Design and Implementation of a New Funding Model

The December 2022 report described a conceptual framework developed to address Missouri's needs, starting with a set of principles that would guide the funding model's design and including details about each of the important components. The relevant sections of that report are reproduced below, with only minor changes, as no subsequent feedback has necessitated revisions.

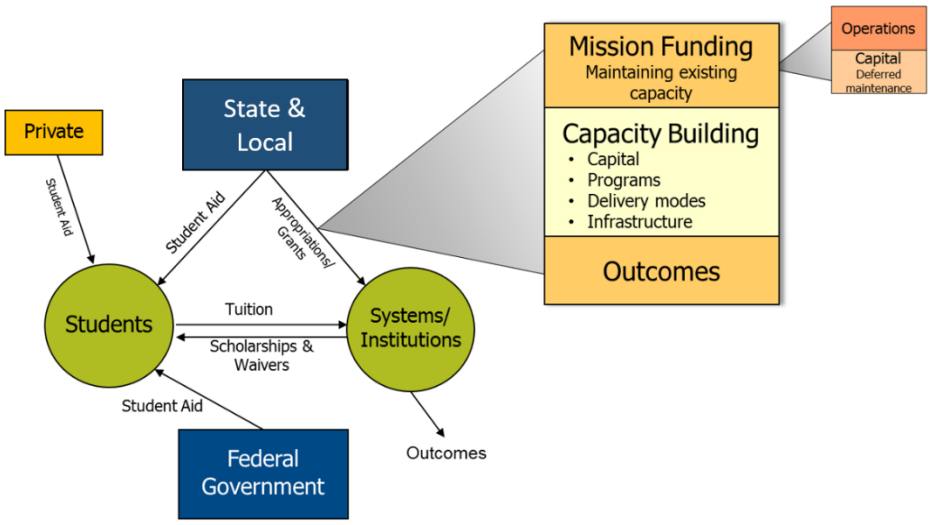
Drawing on its prior experience working on higher education finance projects in other states, NCHEMS developed a set of basic principles to guide the design and implementation of the funding model, including provisions to incentivize institutional performance. This set of principles was reviewed by Department leadership and institutional leaders, and adjustments were made in accordance with feedback received.

<u>Design Principles</u>

1. The funding model should be developed in the context of the full array of higher education funding flows that support institutional operations, including:
    a. Appropriations to institutions—those amounts provided by the state and, for two-year institutions, local governments.
    b. Tuition and fee revenues.
    c. Student financial aid—primarily grant aid from all sources-federal, state, private, and institutional aid in the form of scholarships and waivers.

    Figure 14 illustrates the relationships among these funding flows. The allocation model being developed deals with the mission (operations component only) and outcomes components of the model. It recognizes the need for capacity-building funding but does not provide calculation routines for specifying the amounts of such funding.

Figure 14. The Flow of Funds



2. The funding model should be aligned with a set of agreed upon priorities, such as those specified in MDHEWD's Strategic Plan. In particular, the model should create incentives for a.) increasing the number of postsecondary credentials produced annually, thereby increasing the educational attainment levels of the state's population and b.) responding to workforce needs in the state and contributing to workforce participation rates.
3. In order to align funding with completion goals and workforce needs, improved student success should be at the core of the funding policy. This means that:
    a. Institutions should be provided with funding that is adequate to support the fulfillment of their different missions—to pay for the array of programs they offer and provide the particular support services required to ensure the success of the students they enroll, with their varied needs. The objective should be to fund institutions at a "frugal" level—sufficient to meet needs but not extravagant.
    b. Institutions should be held accountable (and rewarded) for contributing to established state priorities. This means that there should be a performance or outcomes component to the funding model that rewards institutions for their contributions toward the achievement of the state goals.
    c. Efficiency of operation and collaboration in the delivery of services should be incentivized in the design of the allocation model. In this regard, the model should help to dampen competition for programs and students and reward institutions that work together in ways designed to improve efficiencies in operations and create more options for students at lower costs.
4. The design of the model must recognize the differing governance structures of institutions. Allocations are made to Boards, not to individual institutions. As a result:
    a. The University of Missouri must be treated as a single institution with allocation to the individual campuses in the system to be determined by the Board of Curators.

   b. The same is true for St. Louis Community College and Metropolitan Community College with allocations to individual campuses made by their respective Boards of Trustees.

5. The performance component of the model should be designed in such a way that it is a funding model, not an allocation model. For example, each unit of output should generate a fixed amount of funding. This stands in contrast to a model that allocates a fixed pool of performance money to institutions based on their shares of the outcomes produced. This latter approach too often creates situations in which institutions lose funding even when they improve performance, but other institutions that improve at a higher rate receive a preponderance of the available funding. This circumstance, though not uncommon in Performance Based Funding (PBF) models, corrodes the legitimacy and effectiveness of the model. Institutions that show improvement but fail to see a financial benefit are unable to sustain and enhance the practices that created the improvement, even if their motivation to seek performance improvements remains undiminished (a circumstance that strikes at the core of the intent behind such funding models).
6. Performance funding must be designed in a way that meaningfully incentivizes continuous improvement at all institutions while simultaneously recognizing that institutions have differing levels of capacity and room for improvement. Once an institution approaches a specified threshold for high performance, it should be rewarded for maintaining that level of performance, not penalized for failure to make additional, increasingly demanding improvements.
7. Institutional funding should be provided at levels that allow affordability for students to be maintained. For state goals to be reached, more students will have to enroll and be retained. This can only occur if affordability is not a constantly rising barrier to initial and continued enrollment.

Implementation Principles

1. The implementation of the new model should occur over multiple years, ideally 3-4 years, to allow for institutions to react to new incentives and plan effectively. This implementation timeline also recognizes that institutions will need time to adapt to equity adjustments that account for how the institutions have changed relative to one another in ways that affect costs that are not considered in the base-plus approach.
2. Implementation should recognize that there will likely be reallocations of state funds among institutions. Institutions should not be held harmless, but stop-loss and stop-gain provisions should be incorporated into the implementation plan during the transition period. Such provisions limit how much institutions can lose or gain in any one year during the transitional period. A less desirable alternative is to hold institutions harmless but preclude them from receiving new monies until all equity adjustments have been made. This problem can be alleviated by special equity allocations that serve to level the playing field early in the implementation process.

3. The allocation model should be used both in years when appropriations increase and when they decrease. In years when total appropriations decrease, the amount for each institution should be calculated, these amounts summed, and a proportional decrease applied to each institution in order to bring request and allocation into balance.
4. Achieving equity in the base funding levels across institutions should be considered simultaneously with performance funding. As long as there remains inequity in institutional funding, state support should be provided in larger shares based on resolving that inequity. Once equity is achieved, a greater proportion of state funding can be devoted to performance. This balance should be monitored and may need to be readjusted periodically.
5. The funding model to be adopted should be "owned and operated" by the Missouri Coordinating Board for Higher Education in order to ensure that it can be flexible enough to adapt to changing conditions rather than requiring changes be made through the legislative process. In practice, this means that the specifications of how the model works, the variables to be used and their values, etc. should not be inscribed in statute, but rather be managed by MDHEWD and supported through a regular and consistent review process involving consultation with the institutions and policymakers.

The Conceptual Framework Underlying the Funding Model

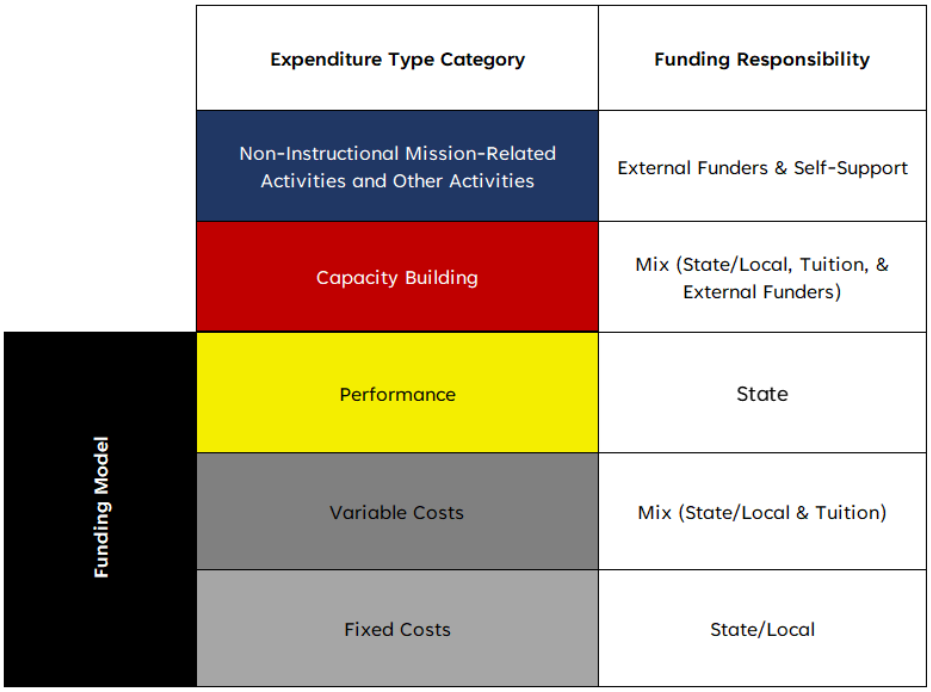
The conceptual framework, developed by NCHEMS and used to good effect in other states, provides the foundation for the funding model and is presented in simplified form in Figure 15. It is driven by:

- The idea that institutional costs and state funding should be linked in policy and in practice.
- The recognition that institutions vary in their missions—instructionally they offer a varied mix of programs to different populations of students and also engage in research and public service activities at different levels; a funding model must account for these differences in mission.
- The state of Missouri's responsibility to maintain its state assets, such as the maintenance of institutional facilities but also curricula that are relevant and oriented toward workforce needs and students' educational aspirations.
- The imperative to provide educational services to all Missourians, regardless of their background or where they live within the state.
- The need for state funding policy to reward institutions for improvement in making contributions to the achievement of state priorities related to raising educational attainment levels, driving economic growth, operating efficiently, and ensuring educational opportunities are widely available to all.

This diagram conceptualizes the full operational costs of a public institution by dividing those costs into broad categories and assigning a funding responsibility for each. A particular feature of this framework is that it estimates the total funding needed to run an institution effectively as a function of the different types of costs its activities generate. Only after the model generates the estimates are each institution's costs summed and the total funding requirement determined. In that respect, it works in the opposite direction from a Base-Plus approach. A Base-Plus approach works by

allocating the available funding to institutions with only a vague sense of what the actual costs of different institutions may be and how they have changed over time.

Figure 15. Institutional Adequacy Conceptual Framework (Simplified Version)



This framework has the following components:

1. **Fixed costs**—reimbursement of costs that are *relatively* impervious to the total enrollment of the institution, but which reflect a "frugal" level of funding needed for administrative operations, as well as to maintain the value of the institution's assets at current levels.
2. **Variable costs**—funding to cover costs that vary in accordance with the number of semester credit hours (SCH) produced, differentiated by discipline and level, and in accordance with the characteristics of students served by the institution.
3. **Performance**—funding based on contributions made to goals established in the Department's strategic plan. The plan emphasizes improvements to education attainment (especially among students who are Black, Hispanic, or residents of rural Missouri) and to workplace participation among those same populations. In spite of the fact that improvements in outcomes for specific racial groups is an explicit goal in the Department's Strategic Plan and contrary to research that race/ethnicity has its own separate effects on student outcomes that are not fully addressed by alternative variables, it may be that use of race as an explicit factor in the funding model will not be acceptable to key decision-makers. If so, outcomes for Pell recipients may be recommended as a partial proxy, potentially supplemented by information about student characteristics that research shows are related

to lower rates of academic success (e.g., age, first-generation status, English-language-learners[13]).

4. **Capacity Building**—this category captures investments in new programs/capacity or enhancements to existing capacity. These are allocations that are made to institutions that are outside the scope of the funding model. It is appropriate to consider certain existing Missouri programs under this category. One such example is the MoExcels Workforce Initiative, which makes funding available to support employer-driven education and training initiatives proposed by institutions. Activities funded through MoExcels that achieve performance goals may have their costs rolled into the institution's base funding support.
5. **Non-Instructional Mission-Related Activities and Other Activities**—this category covers institutional costs for activities that are largely self-supporting. This includes research and public service activities that are funded externally, and which tend to pay for their own direct costs and contribute revenues that cover indirect operational costs (as well as capital expenditures). It also includes the costs of other activities such as housing, athletics, museums, performing arts centers, and the like, which are typically expected to pay for themselves. In numerous states there is an explicit prohibition against the use of state funding for the support of such activities.

As indicated in the diagram above, the portion of institutional funding requirements that the new funding model will address includes only the fixed and variable costs and the performance component.

The simplified version of the conceptual framework is expanded in Figure 16. This more detailed view offers a new lens for looking at institutional costs and funding requirements. It does so by unbundling the elements of what has traditionally been called "Education and General" or "Education and Related" expenses, which combine institutional costs for delivering instruction, administering the enterprise, and caring for its assets into a single, largely opaque value that purportedly represents the costs of doing business in higher education. Instead, the more detailed framework captures the elements of the fixed and variable costs in ways that make explicit the levels of funding necessary to support an institution's essential administrative core at an appropriately "frugal" level; assure that the assets held by an institution on behalf of the state are maintained at an adequate level; provide for the instruction of students enrolled in programs that vary in cost by size, level and discipline; and support the success of those students through funding that is sensitive to the differing student characteristics at different institutions. Incorporating a performance element into the framework is intended to assure that incentives exist to drive improvement in the achievement of state goals. Beyond that, the framework accounts for the additional funding institutions require to develop new or enhanced capacity, to be initially provided outside of the funding model as seed support. It also accounts for recurring activities undertaken in

[13] Levin, J., Baker, B., Lee, J., Atchison, D., & Kelchen, R. (2022). *An Examination of the Costs of Texas Community Colleges.* Institute of Education Sciences, Regional Education Laboratory Southwest. https://ies.ed.gov/ncee/rel/regions/southwest/pdf/REL_2023142.pdf.

the public interest that may be partially paid for by the state. The cooperative extension function of Land-Grant institutions is an example of this. Finally, the framework captures costs associated with activities that are traditionally self-supporting.

Figure 16. Institutional Adequacy Conceptual Framework

		Category	Function and Roles	Funding Responsibility
Funding Model	Not (Primarily) Instruction	Other	Advancement, auxilaries, athletics, etc.	Institution
		Externally Funded Research and Public Service	Grants management, community engagement, museums, arts, extension services	External Funders
	Strategic Goals	Purchase of Goods and Services	Funding for specific purposes, i.e., applied research on a particular topic of special interest (e.g., public health), incentives to seed and support shared academic program delivery, noncredit offerings	Mix (State & External Funders)
		Capacity Building	Funding needed to start new programs or fund initiatives prioritized by the General Assembly, the Governor's office, or through another planning process with institutions	Mix (State/Local, External Funders, & Tuition)
		Performance	Factors in the model that recognize: activities related to strategic plan, closing equity gaps, economic development	State
	Variable Costs	Audience	Characteristics of student populations that are related to higher costs required to produce equivalent student outcomes, measured by weighted semester credit hours (SCH) or added weights applied to headcount	Mix (State/Local & Tuition)
		Scale	Enrollment levels, measured by semester credit hours (SCHs)	Mix (State/Local & Tuition)
		Scope	Mix of instructional programs, measured by semester credit hours (SCH) weighted by level and discipline	Mix (State/Local & Tuition)
	Fixed Costs	Asset value preservation / maintenance	Shares of facilities replacement value of facilities, technology value, payroll (for professional development)	State/Local
		"Frugal" foundational funding	Benchmarked against similar institutions with relatively low spending on administrative expenses	State/Local

With respect to the diagram, these categories break down into the following (starting at the bottom and moving up):

- **Foundational** – expenses necessary for the core administration of the institution: employing the senior institutional leaders who perform essential functions related to governance, information technology, audit/accounting and other compliance-related activities, human resources, etc.
- **Maintenance/renewal** – operational expenditures required to ensure that institutional assets are appropriately tended to at a level and in a manner that prevents further depreciation

(i.e., existing conditions do not worsen); these include maintaining physical facilities,[14] addressing regular equipment needs, assuring curricular relevancy, and supporting professional development, as well as planning activities that ensure the institution maintains its ability to serve its mission.

- **Scope** – expenses related to the delivery of the institution's array of academic programs and accounting for variation in the costs of programs with different costs of delivery.
- **Scale** – expenses related to the size of the enterprise; more students require more classes, faculty/staff, support services, equipment, etc.
- **Audience** – expenses related to serving different populations of students whose needs for support services vary by type of risk factor.
- **Performance** – expenses associated with efforts to stimulate continuous improvement in institutional performance according to a set of established priorities, as well as the infrastructure to sustain a culture of innovation and reliance on high-quality data.
- **Capacity building** – start-up expenses necessary to add new programs, implement new interventions intended to yield more effectiveness, scale best practices, etc.
- **Purchase of goods and services** – expenses associated with distinctive mission-specific costs such as the pursuit of activities related to unique statewide academic programs, state-funded research, Land Grant and other public service activities, and other endeavors that serve specific state needs.
- **Externally funded research and public service** – expenses associated with carrying out grant and contract-funded activities that are neither institutionally funded nor funded by the State of Missouri.
- **Other** – expenses associated with all other functions, including advancement, auxiliaries, athletics, and other independent operations, etc.

An important purpose of the adequacy framework is to help policymakers better understand the links between institutional costs and funding requirements. At its most basic, the framework suggests that there is a minimal amount of expense associated with operating an institution that the state—and local governments in the case of Missouri's community colleges—is obliged to cover. This "frugal" funding level represents what is necessary to preserve the institution's value as a state (and local) asset. Just as Missouri's ownership of any of its state parks incurs costs even when it attracts no fee-paying visitors—for oversight of the park system, financial services, environmental compliance, road and structure maintenance, search and rescue capabilities, etc., costs which are exclusively the state's responsibility to pay—so does ownership of its public colleges and universities.

This level of unavoidable expenditures is represented in the diagram by the Foundational and Maintenance/Renewal categories (the two categories in blue). The dark blue Foundational funding

[14] This relates to operational maintenance costs, not capital costs. These are the costs that are intended to keep deferred maintenance backlog from getting any worse, not to make progress in reducing that backlog.

component refers to the expenses necessary to operate the core administrative functions. The light blue Maintenance/Renewal category reflects the expenses necessary to keep the state/local asset from deteriorating, not to make improvements in the institution's conditions. In addition to maintaining facilities and doing regular equipment upkeep, it is also important to recognize that a higher education institution—which must count its curriculum among its most critical assets as well as the faculty who renew, support, and deliver it—incurs costs for curricula revision and professional development to maintain the value of those assets.

This minimal level of funding represents what is necessary to maintain the institution's value as a delivery site to student populations and communities that, in the institution's absence, could not be served effectively (or possibly at all). Accordingly, it is especially important to understand that smaller institutions have less capacity to spread their fixed costs over more students to benefit from economies of scale, making the recognition of these core costs all the more crucial in a funding model. In effect, these two categories are conceptualized as the funding support that is necessary simply to open an institution's doors and to preserve its value as a state (and local) asset. No tuition or other revenue should be expected to bear the burden of these "value preservation" costs, which is solely the responsibility of the asset's owner. Tuition revenue should be reserved to pay for instructional costs—those that are reflected in the Scale, Scope, and Audience categories—and to support other operational costs associated with organizational capacity and enhancement.

Next in the framework are the variable costs. These costs represent the direct expenses of the instructional mission, and they vary among institutions based on:

- Scale—the number of students enrolled.
- Scope—the mix of programs by field and by level—upper-division or graduate courses in engineering are more expensive to offer than lower-division general education courses.
- Audience—the needs of the students being served; students who are older or who come from low-income, first-generation, or underrepresented backgrounds tend to require additional support as they make their way into college and on to a degree. Growing the number of educated members of the workforce requires attention to meeting the needs of students being served.

The variations among institutions and from year to year in scale and scope are addressed by using weighted semester credit hours (SCH), with the weighting determined by research on the relative costs of different disciplines at different levels, while variations in audience refer to the additional resource requirements necessary to improve the likelihood that all students will be successful. It is important to note here that these all represent current costs, particularly those relating to audience—the characteristics of students. That is, this reflects the actual costs an institution incurs to produce awards at the current pace with its current population of students. Changes to any of the elements of this production function may require additional funding—improving the success rates of academically underprepared students bears additional cost, as does serving a larger number of students overall.

The above elements collectively describe a way of defining funding adequacy for each institution to carry out its instructional mission. They also make up what is needed to assess the extent to which a state is funding its institutions equitably. That is, if one institution has access to resources—state and local appropriations, plus tuition revenue—that are sufficient to cover its fixed and variable costs, while another does not, that would serve as evidence of inequitable funding. The degree to which this condition exists can be expressed as funding resources relative to total cost estimates.

The next component in the conceptual framework is funding to support performance improvement and incentivize institutions to link their activities and investments to the achievement of state goals. These are the priorities expressed in MDHEWD's strategic plan—raising the educational attainment of the working-age population to 60 percent and the labor force participation rate to 70 percent, while eliminating equity gaps (among populations who are Black, Hispanic, or rural) in both measures, by 2030. The performance component should follow effective practice such as:

- The total amount of funding available through performance incentives should be sufficient to garner the attention of institutions.
- The set of metrics should be as straightforward, transparent, and as few in number as possible.
- Provisions should be made to avoid creating perverse incentives; additional weights should apply to hard-to-serve populations in order to ensure that institutions can be rewarded for being successful with a larger number of such students.

In addition, the performance component should be designed to limit the extent to which it breeds competition among institutions for the available funding. Institutions that show improvement on the metrics should be able to count on additional funding regardless of how well other institutions perform.

Moreover, if institutions improve, they should have some assurance that they will be rewarded as anticipated. Failure to follow through with earned additional funding will undermine the performance funding model. In fact, the state of Missouri expended significant effort in the past decade to create a new funding model and incentives, but when additional funding was not allocated, that new model was ultimately abandoned even though it remains on the books. In an effort to ensure that this initiative avoids a similar fate, the approach to designing the performance funding component of the framework is consistent with the other components: the value of the points to be earned, once established for a given budgetary year or cycle, should be considered fixed and all efforts should be made to pay institutions the resulting amount the model determines that they earned.

Additionally, the conceptual framework recognizes that not only do institutions require additional funding to create new programs or grow existing worthy activities, but the state's political leadership will want to make specific investments in postsecondary education outside of what the funding model estimates is required for supporting the public institutions in their current configurations. The framework creates space for these investments in two ways: investments in added capacity and allocations made to provide for the purchase of specified goods and services.

Investments in added capacity are intended to build institutional capacity to better meet clearly defined state needs in priority areas. Such investments may be directed to one or more specific institutions—for instance, to assign an institution the task of developing a new program that meets a specific workforce need in a specific geographic area. This kind of capacity-building investment should be non-recurring; although it may require multiple years of funding to get a new program off the ground, it should be able to stand on its own at some point in the reasonably short term. As this new capacity develops and comes online, the results should be observable in the scale, scope, and audience components of the framework. In other words, with respect to investing in capacity, the state is not expected to fund the related activity outside of the funding model in perpetuity.

Given the imminent challenges created by the anticipated decline in prospective students enrolling direct from high school, investments in added capacity include seeding collaborations among multiple institutions.[15] Such funding support may serve to stimulate collaborations that show promise for creating efficiencies that spread across multiple institutions or ensuring that academic programs are more widely available without requiring individual institutions to set up new programs. This is particularly important in less populated areas where demand is likely to be more sporadic or where associated costs are simply too great. As collaborations become more established and entrenched within participating institutions' operations, the state can look for new investments. However, there may be cases where there is an ongoing need to sustain worthy collaborative activity, as noted in the "purchase of services" description that follows.

A second set of payments to be made by the legislature occur when one or more institutions is effectively a preferred vendor for a product or service that it is specially equipped to provide. These purchases of goods and services may or may not be a source of recurring funds to the individual institutions, but there is not the same expectation that the investments will generate new capacity that can gradually be reflected in the funding model. Among the activities that fall into this category are:

- State-funded research activity (typically applied research that is distinct from research activity funded by other partners including the federal government).
- State-funded public service activity.
- Regional economic development or other civic initiatives.
- Non-credit programming.
- Funding that is necessary to support collaborative activity across multiple institutions that a) would not occur in its absence and b) has the effect of promoting greater operational efficiency across the group of participating institution or supports academic programming to reach specific populations or meet a clear state or regional need. In such cases, the "service" to be purchased is effectively to counteract a market failure.

[15] https://knocking.wiche.edu/wp-content/uploads/sites/10/2020/12/Knocking-pdf-for-website.pdf

Finally, this conceptualization is designed to inform strategic discussions about the balance of revenue sources of different institutions appropriate to their varied missions and the characteristics of their student bodies. Institutions face different conditions in their respective markets, leaving some more vulnerable than others to proportional cuts in state spending. Although it can be difficult to draw a bright line between these categories in accounting data, to the degree that data are available and sufficiently accurate to measure these categories, then the framework also provides quantitative guidance for allocating funding to institutions.

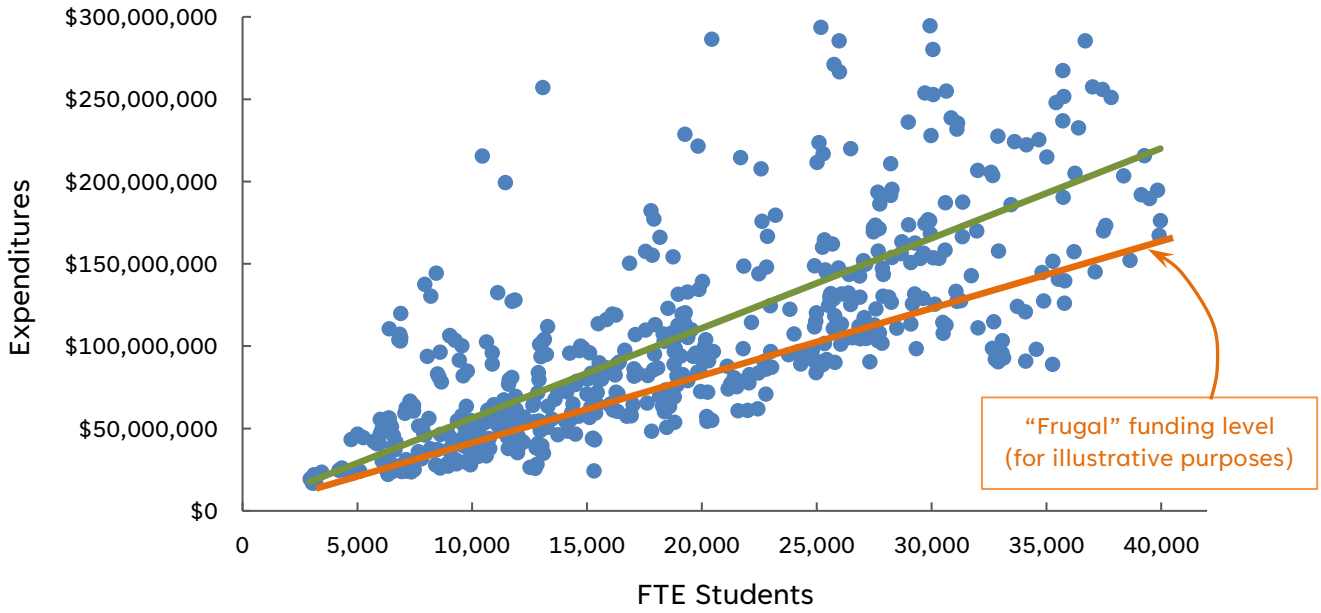
Operationalizing the Conceptual Framework

Having heard general support for the conceptual framework from members of the Advisory Group, key legislators, and other key stakeholders, NCHEMS set out to develop and populate a simulation tool to operationalize the funding model. To do so, NCHEMS gathered publicly available data as well as data requested from MDHEWD and, through MDHEWD, the institutions. Once these data were in hand, NCHEMS built the simulation tool in Microsoft Excel in a manner that permits users to adjust parameters—the specific methods and values to be used in the calculations for each component of the model. A high-level description of the data and methods used in the simulation follows.

Fixed Costs

To assess an institution's fixed costs, NCHEMS first gathered data about institutional expenditures on administrative expenses and instruction-related academic support from IPEDS by sector (public research universities, public comprehensive universities, and public two-year institutions). Next, we calculated the relationship between those expenditures and FTE enrollment, and then identified a benchmark to use for assigning the amount of administrative expenses to be recognized in the state funding model as the "frugal" foundational base. Figure 17 depicts each of the nation's public research universities according to their FTE enrollment and instructional and academic support expenditures. A regression of these data yields the green line, which basically gives the average expenditures associated with each level of enrollment. The NCHEMS approach is represented by the orange line, which defines frugal administrative expenditures at each level of enrollment as a fraction of the average shown by the green line. Each sector is analyzed this way separately. The simulation allows for the specifications of the orange line to vary, but the end result is an estimated cost for general administration for each Missouri institution, based on the principle that the state's coverage of these expenses should be reasonable but below the national average of similar institutions and according to each institution's enrollment. Figure 18 through Figure 20 depict each of Missouri's public institutions within their respective sectors according to the analysis above.

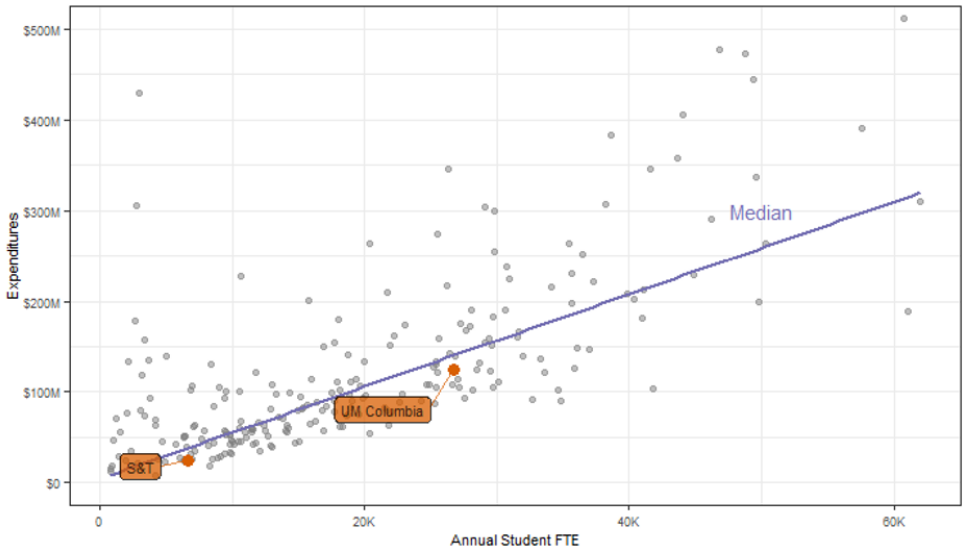
Figure 17. Instructional and Academic Support Expenditures Relative to Total FTEs, Public Research Universities, FY2019-2021



Notes: Average expenditures are the sum of institutional support expenditures plus academic support expenditures related to instruction averaged over the three fiscal years. Academic support expenditures related to instruction are estimated by multiplying total academic support expenditures by a ratio that is calculated as instruction expenditures as a proportion of expenditures on the tripartite mission of higher education (instruction, research, and public service).

Source: NCES IPEDS.

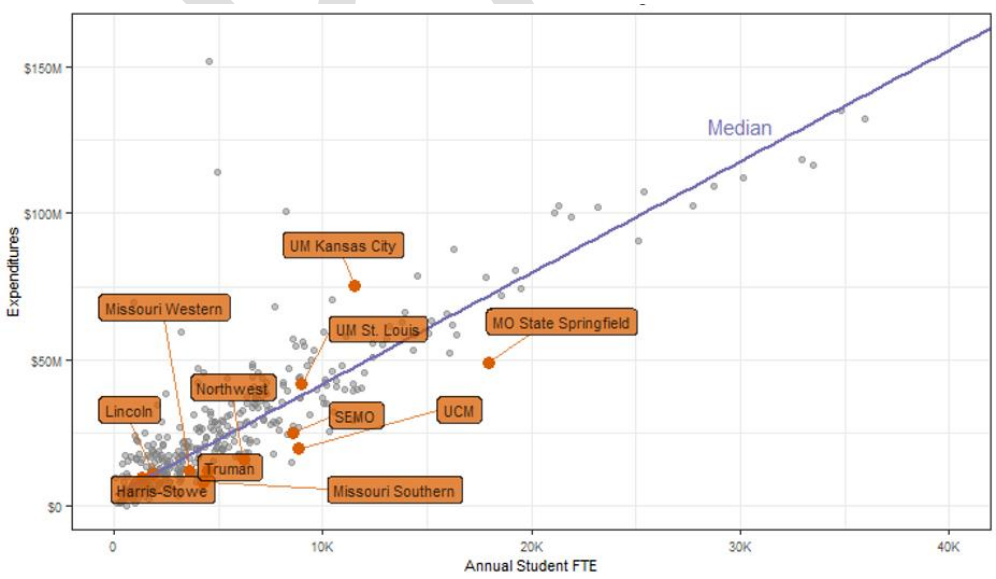
Figure 18. Instructional and Academic Support Expenditures Relative to Total FTEs, Public Research Universities, FY2019-2021



Notes: Average expenditures are the sum of institutional support expenditures plus academic support expenditures related to instruction averaged over the three fiscal years. Academic support expenditures related to instruction are estimated by multiplying total academic support expenditures by a ratio that is calculated as instruction expenditures as a proportion of expenditures on the tripartite mission of higher education (instruction, research, and public service).

Source: NCES IPEDS.

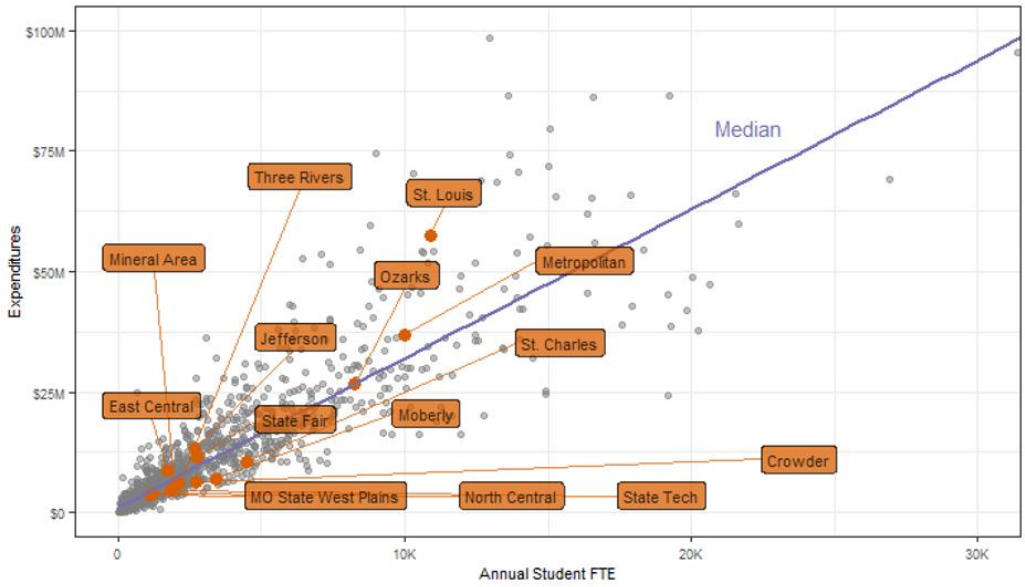
Figure 19. Instructional and Academic Support Expenditures Relative to Total FTEs, Public Comprehensive Universities, FY2019-2021



Notes: Average expenditures are the sum of institutional support expenditures plus academic support expenditures related to instruction averaged over the three fiscal years. Academic support expenditures related to instruction are estimated by multiplying total academic support expenditures by a ratio that is calculated as instruction expenditures as a proportion of expenditures on the tripartite mission of higher education (instruction, research, and public service).

Source: NCES IPEDS.

Figure 20. Instructional and Academic Support Expenditures Relative to Total FTEs, Public Two-Year Institutions, FY2019-2021



Notes: Average expenditures are the sum of institutional support expenditures plus academic support expenditures related to instruction averaged over the three fiscal years. Academic support expenditures related to instruction are estimated by multiplying total academic support expenditures by a ratio that is calculated as instruction expenditures as a proportion of expenditures on the tripartite mission of higher education (instruction, research, and public service).
Source: NCES IPEDS.

To these frugal foundation estimates, the model adds estimates for the costs of maintaining and renewing the asset that is the institution. For cost estimates of maintaining physical facilities, NCHEMS relied on the replacement value of the public institutions' education and general buildings. Importantly, this estimate is not intended to cover any costs for reducing an institution's existing deferred maintenance backlog. Rather, its purpose is to help ensure that that backlog does not get any worse. Missouri has not collected high-quality data in a consistent manner about the costs of replacing or repairing equipment used for instruction and administrative functions, so NCHEMS used data reported to IPEDS for depreciation as an imperfect alternative. In addition, among the less-commonly recognized durable assets of higher education institutions is the curriculum. An institution's current programs need to be kept up to date and relevant, and doing so bears costs. The model uses data on professional staff and faculty salaries as a way to estimate those costs. Insofar as possible, the model relies on industry standards for what it takes to maintain asset value in doing these estimations.

Variable Costs

To estimate an institutions' variable costs, the model relies on semester credit hours (SCHs) attempted or earned in broad academic or occupational subjects according to level and by students with different characteristics. With respect to the Scale, Scope, and Audience elements of these variable costs, the total number of SCHs provides information about the scale of the institution, the

disciplinary and level of those SCHs addresses the scope of the institution, and the types of students taking or earning SCHs concerns the audience the institution serves.

For scope, the model applies a set of weights based on disciplinary area and level (developmental, lower-division, upper-division, master's, and doctoral) that are drawn from analyses that have been done elsewhere on the variation in costs associated with offering courses in different academic departments at different levels. These weights are also sensitive to differences in the two- and four-year sectors; generally, the weights are lower in the two-year sector, but not in all cases as courses with heavy laboratory or hands-on study (e.g., welding) are often more heavily weighted. NCHEMS' research turned up cost studies that included weighting schemes in Minnesota, Nevada, Oregon, Texas, and Virginia.

For audience, the model recognizes that all students have unique needs, which can best be met through tailored support services offered through institutions. Offering these services, however, is not cost-neutral. Yet given demographic changes currently underway and expected to accelerate in the future, meeting the state's goals for educational attainment hinges on its institutions' ability to boost degree and certificate completion for populations that have had less success historically in completing postsecondary education. Thus, the model is designed to give additional weight to students who are from one or more of any of the following groups: adult learner, first-generation, possessing a low high school grade point average, low-income, rural, and underrepresented minority. Missouri currently has some useful variables to identify each of these groups, but not all. Low-income students were identified as Pell Grant recipients. Adult learners were identified as being aged 25 or older. Rural students were identified by the county of their permanent residence. Underrepresented minorities were those who were American Indian or Alaska Native, Black non-Hispanic, or Hispanic. The simulation is able to add weights to these characteristics based on either SCHs or headcount.

Simulations of the Funding Model

In order to run the simulation and test the adequacy model, NCHEMS analyzed the simulated results under a series of scenarios comprising different values for each of the parameters in the model. These analyses have yielded a set of parameters that NCHEMS proposes and which are used to provide a view of the results. NCHEMS has shared these preferences with the Advisory Committee and MDHEWD, although it is not fair to characterize them as having endorsed the parameter values. The preferred parameter values are as shown in Figure 21.

Figure 21. Proposed Parameters in the Adequacy Model

Component	Parameter	Value / Range	Justification
Frugal Foundation	Benchmark	Institutional Support & Academic Support	Institutional support and the instructional share of academic support provide the closest approximation of the expenditures addressed in the frugal foundation. Using national data for public institutions provides assurance that the

Component	Parameter	Value / Range	Justification
			resulting calculations for the foundation are grounded in external data that provides a realistic benchmark for assessing those costs.
	Minimum FTEs	1,500 – 1,800	Due to their difficulty in achieving economies of scale, small institutions should be treated as if they have a reasonable minimum number of students to be able to afford appropriate levels and quality of administrative services.
	Frugal Cost at Zero FTEs	67%	Institutions have minimum costs to provide essential and basic administrative services, e.g., executive leadership, procurement, human resources, accounting, and compliance, even when there are no students. Assigning the state the responsibility of paying for two-thirds of the sector-wide average provides limited funding to meet those needs while also incentivizing institutions to keep such costs in check. Two-thirds is roughly equivalent to the 40th percentile of public institutions nationally.
	Cost Increases Linked to Enrollment	30%	Administrative costs rise with enrollment, but at a far lower pace than instructional costs do. Limiting the amount of those marginal cost increases to 30 percent of the sector-wide average for what the state will support recognizes that more funding is needed as the institution gets larger while also ensuring that the institution has a powerful incentive to resist allowing them to get out of hand. Furthermore, reducing the weight given to this cost factor is appropriate given the imperfect nature of measuring academic support expenditures consistently across institutions, especially as they are mingled with non-instructional parts of an institution's mission, especially research and public service.
Asset Maintenance & Renewal	Campus and Facilities	1.5% of Missouri Replacement Value	Effective practice in other states suggests that the costs of maintaining physical spaces is roughly 1.5-2 percent of total replacement value.
	Equipment	5% of IPEDS depreciation	Ideally, this factor would be calculated as equal to about 1/7 of total replacement value for equipment used for E&G-related activities. But Missouri does not collect high-quality data sufficient to the task, so the only available alternative is IPEDS depreciation; this measure applies to all depreciable physical assets, including both facilities and equipment, so using a small share of the total is appropriate.
	Personnel and Curriculum	1.5-2%	This amount follows industry standards in budgeting for the retention and renewal of an

Component	Parameter	Value / Range	Justification
			organization's personnel. Industry standards typically call for 2-3 percent of total salaries to be set aside for this purpose. Some portion of the costs of professional development should be considered as part of the frugal base—at least that share that is related to the personnel executing core administrative functions. In an education setting, a college's curriculum itself is an asset that requires continual renewal, updating, and tuning to better meet society's needs and technological advancements. The state's responsibility for ensuring adequate support for public higher education extends to preserving and maintaining that asset. The approach best able to account for the costs related to the renewal of the curriculum is to set aside a relatively higher amount for professional development expenditures for faculty and staff, as their knowledge, skills, and abilities are tightly coupled with curriculum quality and with student success.
Scale & Scope	SCH Weighting Package	Adapted from Nevada's weighting scheme	In most programmatic areas at the undergraduate level, variation in the weighting schemes is relatively minimal. Where variation is greatest is in vocationally oriented programs especially at the post-baccalaureate level. Nevada's approach to setting discipline and level weights has the advantage of relying on a multi-state analysis of instructional costs. It also differentiates its weights based on whether they are produced at its public two-year or public four-year institutions.
	Discipline-Level Weights	D-L Only	This is a more straightforward way to estimate costs of delivering a credit hour for different disciplines and levels without further complicating the weighting with additional weights for student characteristics.
	Source of SCH Cost	Texas Less Institutional Support Expenditures	Most of the options here yield per SCH costs that hover in the $200-$215 range for four-year institutions and somewhat less for two-year institutions. Texas's cost study is already being used in at least one other state (Louisiana, with adaptations) and is highly detailed. Removing institutional support costs from the SCH cost is sensible since the model accounts for those functions in the frugal base.
	SCH Type	Earned	While institutions face the real costs of offering seats in course sections to students who withdraw or fail the course, using earned SCHs (those completed with a grade of "D" or better)

Component	Parameter	Value / Range	Justification
			provides incentives for institutions to help their students be successful. There are some concerns about it fueling grade inflation. But there is no evidence to suggest that faculty grading practices would change based on this specific component of the funding formula. In any case, a number of other states have moved in the direction of using earned SCHs to embed performance incentives more deeply in their funding models.
	Frugal Cost Allotment	85%	Reducing the SCH cost is another important way that Missouri can ensure that its support for postsecondary institutions is being used judiciously and helps keep costs down. In addition, applying it to the Texas per SCH amount makes sense because Texas's postsecondary education structure relies so heavily on research universities that there is good reason to believe that costs are lower in Missouri's mix of institution types.
	Health Care First Professional Programs	1st Prof Base Adequacy	The evidence base for determining appropriate weights for delivering SCHs in medical and dental education, pharmacy, veterinary medicine and related first-professional fields is not as robust as the weights for other combinations of discipline and level. This approach mirrors those taken by states like Texas and Oregon that fund their medical schools through a separate mechanism and uses each of the institution's estimated total GF and NGF revenue in lieu of any SCH-based calculation for credits in those programs. This alternative applies only to UM-Columbia and UMKC. It sums the instruction, academic support, and student services expenditures per FTE of all of the stand-alone public health care teaching institutions in IPEDS, identifies the resulting total cost at the 40th percentile, and multiples that by the number of FTEs accounted for by the removed SCHs in CIP 51. Those products are then added to the variable costs estimate for UM-Columbia and UMKC, respectively.
	Inflation	7.4%	As most of the data in the model are based on FY2021, it is appropriate to account for unusually high inflation that has occurred since. The simulation relies on the most recently available two-year increase in inflation as determined by the Higher Education Cost Adjustment (HECA).
Audience	Adult	$1,000	

Component	Parameter	Value / Range	Justification
	First-Generation	$1,000	These are all categories of students generally understood to require additional supports to reach equivalent levels of success. The actual cost of those additional supports is the subject of ongoing research. However, the supports students need is more straightforwardly calculated on a headcount basis. Students with any combination of at least two of the above characteristics fall into the multiple categories group. Deliberately accounting for the costs of serving institutions' distinct student populations effectively is critical to meeting state goals related to attainment and economic opportunity and prosperity, goals which cannot be achieved without giving all students the tools to be successful in completing degrees and certificates.
	Low-Income	$1,000	
	Academic Preparation	$1,000	
	Rural	$500	
	Underrepresented Minority	$500	
	Multiple Categories	$1,500	
Cost-Sharing Targets	Student Portion of SSA Costs	Selective research universities with health science centers (UM-Columbia and UMKC) – 80% Other selective UM Campuses (UMSL and S&T) and Missouri State – 75% Comprehensive institutions (Harris-Stowe, Lincoln, Missouri Southern, Missouri Western, Northwest, SEMO, Truman, UCM) and State Tech – 65% All community colleges – 45%	This approach to cost-sharing is based on these principles: 1. Cost-sharing applies only to the costs calculated for the SSA component. One hundred percent of the costs of the frugal foundation and asset maintenance and renewal is the obligation of the state (with local governments contributing in the two-year sector) to preserve the value of the institution as a public asset. (This means that the state/local portion for all costs calculated by the model will be greater than these targeted levels.) 2. Cost-sharing targets should vary by institution or institution type to reflect the very different capacity to generate revenue from non-state sources, especially tuition. Institutions that are open access (and expected to grow to meet demand) and serve relatively larger shares of low-income, less academically prepared students and adults should have a larger share of their operational costs covered by the state than institutions that are more selective, can charge relatively higher tuition prices, and attract substantial numbers of non-residents. A differentiated set of cost-sharing targets accomplishes that and reflects the reality. The proposed set of preferred differentiated targets roughly reflects variation in the institutions' reliance on state funding vs. tuition revenue and is also closely aligned with

Component	Parameter	Value / Range	Justification
			institutional type, e.g., selective research universities are given the same targets. Moreover, in keeping with the principles, this approach tries to strike an appropriate balance between simplicity and complexity but grouping institutions and assigning the resulting groups the same cost-sharing target. An alternative that may be considered, at the cost of making the model more complicated, is to use more precise, institution-specific ratios of in- and out-of-state students.

In addition to these parameters, NCHEMS also requested data from MDHEWD for the specific activities that the state is funding institutions to do on a recurring basis. Most of these were clear line items in HB3 and include such expenses as extension services, dedicated applied research projects, and the like. This amount was removed from the total state appropriation available for use in funding the model and instead are being treated as part of the "Purchase of Goods and Services" component in the model. Altogether for FY2021, these set-asides totaled $58.7M.

One important piece largely missing from the model is the growing role that non-credit programming is having in helping students take initial and subsequent steps up the labor market ladder, as well as in providing an important revenue source for institutions and in flexibly allowing them to respond to workforce needs. This is an area of particular growth in the two-year sector. In Missouri, as is common in other states, the quality and coverage of data detailing non-credit activity is uneven or sparse. What exists often conflates activity that the state (or local government) would be eager to support, such as the achievement of workforce-relevant non-credit certificates or industry-recognized certification, as well as programs for personal enrichment that should derive their revenue solely from the students and customized training activity for which colleges contract with employers. Lacking the necessary data, the model does not attempt to estimate the scale and costs of these activities. However, to the extent that the state finds it useful to pay to cover their costs, they can be accommodated in the "Purchase of Goods and Services" component until such time as adequate data become available.

Performance

To construct the performance component for the model, NCHEMS gathered data from publicly available sources, principally IPEDS and the College Scorecard, and made a request to MDHEWD. Work on the performance funding component is still in progress, but conversations with MDHEWD and the Advisory Committee have led to the identification of six areas for which institutions should be rewarded when their performance justifies it. Each of the six areas is list below with a description of the status for measuring and rewarding performance.

1. **Academic Progress:** The performance funding component should be at least partially based on intermediate milestones prior to completion of a degree or credential to ensure that the funding follows the most recent activities an institution has implemented to improve.
2. **Completions:** The strategic plan is focused on the need to raise attainment rates and close attainment gaps in doing so, so this metric aligns closely to that purpose. This metric counts awards weighted by the "normal" time they take to complete (e.g., four years for a bachelor's degree, two years for an associate's degree) with additional weight given for students who are 25 years old or older or are underrepresented minorities. (These weights for student characteristics are what were publicly available; Missouri data could be used to expand these to the fuller list described in the adequacy model.)
3. **Workforce Responsiveness:** Ensuring graduates in fields in high demand in Missouri is a central goal of the strategic plan. This metric counts awards earned by any graduate in fields covered by the states' FastTrack program.
4. **Postgraduate Outcomes:** There remain important and unresolved questions about how best to account for an institution's performance in returning value on the investment of students and the state after they graduate. The Advisory Committee had numerous conversations on this topic, and it is reasonable to anticipate that more work is needed on this metric in particular. However, in order to move forward with a metric that was clearly a priority in legislation introduced in previous sessions that would direct dollars to institutions on the basis of their graduates' subsequent success, some measure was needed for modeling purposes. It is not unreasonable to expect that a college education should equip a graduate to earn income above the poverty level. Therefore, NCHEMS used College Scorecard data on the proportion of graduates who were earning wages above 150 percent of the poverty level three years after graduating.
5. **Efficiency:** This metric seeks to reward institutions for efficient operations measured by productivity of graduates relative to funding support. The measure is a calculation of awards weighted by "normal" time over $100,000 of state and local funding plus tuition revenue. Ideally, institutions that collaborate in the delivery of a program would both receive credit for graduates.
6. **Collaboration:** In addition to the above-mentioned treatment of graduates from a joint program, the performance model might include funding to encourage and support efforts by multiple institutions to collaborate more effectively as an alternative to creating new, similar programs. The model as currently constructed does not have data to support rewarding institutions for doing so, but MDHEWD has a formal definition for collaborations that such a measure could be built upon.

While still in development, the performance model draws on the principles previously outlined in prioritizing improvement and in rewarding excellence, as well as through design features that discourage gaming and reduce unintended incentives known to be present in other states' performance funding models. First, measures are designed so that each institution's improvement is designed in comparison to its prior performance—generally the most recent year versus the average

of the three prior years' performance. This decision enhances continuous improvement while also reducing unproductive competition among institutions. Second, the academic progress, completions, and workforce responsiveness measures are based on counts, not rates. Rates create the possibility for institutions to manipulate the denominator by enrolling the best prepared students, a practice which tends to disadvantage the students the state of Missouri most needs to serve more effectively. Third, because relying on counts is challenging at a time when enrollment is falling, institutions are concerned that a decline in the number of graduates they produce will result in their being punished through a performance funding model. To help address that concern and to ensure that the model is focused on improvement, the design is that institutions will not lose funds as a result of decreases in these counts. More to the point, just as the adequacy component of the model is designed by layering estimated costs, as opposed to allocating funds to institutions from a fixed pool of state funding, the performance funding component is designed so that the value per point is fixed each year and institutions are eligible to receive the product of the number of points they earn times that fixed point value. This further insulates the intent of the approach so that it focuses on improvement.

In addition, stakeholder input suggested that the model include the possibility of earning points for achieving or maintaining excellence to go along with incentives for improvement. Such a feature would serve to limit the impact of declining enrollment on institutions' access to performance funding, it would also give access to the funds to institutions that are already high performers and might struggle to make further improvement. Not all of the performance metrics lent themselves to an appropriate excellence standard, but the model generally treats excellence as being among the top quintile of institutions in their sector on their model, though there is a second excellence measure for institutions that approach their peak productivity over the previous decade in weighted awards. Worth noting is that any excellence measure that relies on national data will constrain how it can be calculated; a potentially better measure of improvement using Missouri data can only be calculated for Missouri institutions and creating comparisons to Missouri institutions that award points for excellence is inconsistent with many of the guiding principles for the funding model. The design for the performance funding component is summarized in Figure 22.

Figure 22. Design for Performance Funding Component

Metric	Improvement	Excellence
Academic Progression	Number of students crossing SCH thresholds or earning industry-recognized credentials	Approaching or exceeding past decade's peak numbers
Completion	Awards weighted by "normal time" and student characteristics	1. Approaching or exceeding past decade's peak numbers 2. Outperforming 80% of nation's institutions by sector
Responsiveness to workforce needs	Awards in FastTrack CIP codes	No excellence measure
Employment outcomes	Percent of graduates earning > 150% of the poverty level	Outperforming 80% of nation's institutions by sector
Efficiency	Weighted awards per $100K of state/local funding & tuition revenue	Outperforming 80% of nation's institutions by sector
Collaboration	Joint programs counted for both institutions in efficiency metric; Number of programs meeting MDHEWD guidelines	No excellence measure

Note: Improvement is measured as the most recent year in comparison to the prior three-year average.

Results

Using the model simulation constructed for this project and plugging in all the parameters outlined above, the results of the estimated costs for each of the adequacy model's components are shown in Figure 23 for the four-year institutions and in Figure 24 for the two-year institutions.

Figure 23. Adequacy Model Cost Estimates, Four-Year Institutions, FY2021

Institution	Frugal Foundation	Facilities & Equipment	Curriculum & Prof Development	Scale, Scope, & Audience	Total
Harris-Stowe	$6,922,214	$1,236,265	$232,290	$11,743,118	**$20,133,888**
Lincoln	$7,311,627	$2,233,637	$372,747	$16,856,005	**$26,774,017**
Missouri Southern	$10,804,644	$3,163,438	$527,110	$38,212,317	**$52,707,510**
Missouri State	$40,398,043	$16,809,414	$2,548,089	$219,659,986	**$279,415,532**
Missouri Western	$10,106,041	$4,607,824	$538,432	$35,147,252	**$50,193,341**
Northwest Missouri State	$15,111,584	$4,395,313	$768,885	$75,017,857	**$95,121,638**
SEMO	$18,086,498	$10,272,016	$1,187,906	$89,885,983	**$119,152,446**
Truman	$11,011,886	$6,366,087	$747,998	$44,523,239	**$62,649,210**
UCM	$18,131,624	$5,789,137	$1,299,014	$112,060,240	**$137,067,579**
University of Missouri System	$106,639,399	$122,451,074	$26,175,117	$721,270,183	**$976,535,773**
Total	**$244,523,561**	**$177,324,206**	**$34,397,589**	**$1,364,376,181**	**$1,820,621,537**

Note: Missouri State's costs include both its Springfield and West Plains campuses; the University of Missouri System's costs include all four of its campuses as well as its system office. These data do not apply to activities paid for by state support for designated services being performed by specified institutions, usually in HB3 (e.g., extension, dedicated applied research projects).

Figure 24. Adequacy Model Cost Estimates, Two-Year Institutions, FY2021

Institution	Frugal Foundation	Facilities & Equipment	Curriculum & Prof Development	Scale, Scope, & Audience	Total
Crowder	$8,765,658	$2,032,945	$301,244	$22,710,583	**$33,810,430**
East Central	$7,187,951	$1,211,000	$192,306	$14,963,338	**$23,554,594**
Jefferson	$8,489,894	$2,084,958	$299,140	$18,829,795	**$29,703,787**
Metropolitan	$19,592,340	$6,801,394	$1,038,766	$72,519,641	**$99,952,141**
Mineral Area	$7,411,905	$1,085,775	$184,763	$14,294,280	**$22,976,724**
Moberly	$9,995,735	$703,743	$223,900	$27,636,378	**$38,559,756**
North Central	$6,922,214	$473,728	$126,702	$9,918,448	**$17,441,093**
Ozarks	$17,912,683	$4,278,271	$669,298	$68,243,769	**$91,104,021**
St. Louis	$21,121,579	$8,126,731	$1,503,316	$73,018,841	**$103,770,467**
St. Charles	$11,946,142	$2,095,760	$444,914	$34,458,257	**$48,945,073**
State Fair	$8,608,556	$1,274,892	$258,457	$22,888,875	**$33,030,780**
Three Rivers	$7,826,388	$1,360,291	$168,685	$15,583,780	**$24,939,144**
State Tech	$7,826,388	$1,997,283	$169,284	$30,313,659	**$40,306,614**
Total	**$143,607,435**	**$33,526,770**	**$5,580,774**	**$425,379,644**	**$608,094,623**

Application of the adequacy model reveals considerable levels of funding inequity across the state. In Figure 25 and Figure 26, equity is measured in aggregate based on each institution's revenue in comparison to their adequacy model cost estimates. That is, the funding equity ratio is calculated as total adjusted revenue over cost estimate minus 1. Institutions that had revenue exactly equal to their costs would have a funding equity ratio of 1; those that have less revenue than their costs would suggest they needed would have a negative ratio, and those with slightly more would have a positive ratio.

Importantly, this upends traditional measures of funding equity, which typically use revenues over some measure of enrollment, usually FTE. Because the conceptual framework being used here gives full responsibility to the state to fund each institution's foundation and asset maintenance and renewal costs, and because those are only loosely correlated with enrollment, it is not reasonable to use enrollment in a measure of funding equity. Nor is it reasonable to focus on state (and local) funding exclusively for the same reason. Instead, this approach asks a simpler question: does the institution have enough revenue to operate effectively? And it tees up the next question: is the institution funded with an appropriate mix of state and local funding and tuition?

Figure 25. Total Funding Equity, Missouri's Four-Year Institutions

Institution	Total Adjusted Revenue, FY2021[16]	Adequacy Model Cost Estimates, FY2021	Funding Equity Ratio
Harris-Stowe	$21,029,908	$20,133,888	4.5%
Lincoln	$19,092,290	$26,774,017	-28.7%
Missouri Southern	$40,014,820	$52,707,510	-24.1%
Missouri State	$217,965,341	$279,415,532	-22.0%
Missouri Western	$45,634,843	$50,399,549	-9.5%
Northwest	$82,607,732	$95,293,640	-13.3%
SEMO	$97,709,073	$119,432,404	-18.2%
Truman	$57,356,259	$62,649,210	-8.4%
UCM	$112,169,548	$137,280,015	-18.3%
University of Missouri System	$1,011,173,532	$976,535,773	3.5%

Figure 26. Total Funding Equity, Missouri's Two-Year Institutions

Institution	Total Adjusted Revenue, FY2021	Adequacy Model Cost Estimates, FY2021	Funding Equity Ratio
Crowder	$19,523,329	$33,810,430	-42.3%
East Central	$16,565,029	$23,554,594	-29.7%
Jefferson	$27,175,524	$29,703,787	-8.5%
Metropolitan	$75,688,578	$99,952,141	-24.3%
Mineral Area	$16,369,454	$22,976,724	-28.8%
Moberly	$21,938,641	$38,559,756	-43.1%
North Central	$9,094,731	$17,441,093	-47.9%
Ozarks	$48,782,621	$91,104,021	-46.5%
St. Louis	$128,594,423	$103,770,467	23.9%
St. Charles	$43,281,890	$48,945,073	-11.6%
State Fair	$19,609,393	$33,030,780	-40.6%
Three Rivers	$13,623,851	$24,939,144	-45.4%
State Tech	$28,581,099	$40,306,614	-29.1%

[16] Because IPEDS treats grant aid as expenses, the revenue that institutions receive in the form of student grants and are used to offset tuition payments are not counted in the net tuition revenue variable in IPEDS. Yet some of those grant dollars are used to pay for instructional costs. Therefore, to partially correct for the omission of that revenue, here and elsewhere in this report NCHEMS' modeling adds the lesser of the sum of federal and state grant aid or discounts and allowances applied to tuition and fees to net tuition revenue. This is an imperfect solution; it more fully accounts for institutions' revenue but it injects some uncertainty in how institutions are reporting these data to IPEDS, which may not be uniform across all institutions.

These tables reinforce those displayed earlier in demonstrating a large amount of funding shortfall across the state. But as is evident, Missouri is riven by inequitable funding among its institutions. Those that are able to raise large amounts of tuition revenue, or have access to substantial local tax funding, are in better position to cover their estimated costs. Those that benefit from neither advantage are trying to make budgets balance with the tightest margins.

Comparing the sector totals to the funding from state and local appropriations and tuition revenue finds that both sectors operated with less revenue in FY2021 than the model suggests they really needed to fully meet state goals (Figure 27). Statewide, this analysis suggests that Missouri's institutions had instructional cost requirements of $2.429 billion but only received $2.174 billion in revenue from state and local funding and tuition (not including the $17 million of local funding that is held out of the model as a way to encourage local governments to support their institutions), leading to a shortfall in total funding of $255 million. After accounting for the cost-sharing targets, in FY2021 institutions had state and local funding needs of $1.245 billion against state and local revenue of $1.022 billion, suggesting a shortfall of $223 million. Since FY2021, the State of Missouri has made impressive new investments in funding support to its public institutions that these results do not capture. In FY2022, state funding for institutions' core operations was roughly $65 million greater than in FY2021. Plus Missouri's state appropriation to higher education grew another $50 million in FY2023 and is set to grow by another $70 million in FY2024. Additionally, there has been no attempt to estimate the change since FY2021 in tuition revenue. At the same time, if enrollment at Missouri's institutions continued to follow a downward trajectory, the model would likely show a reduction in costs associated with reduced SCH production. Together, these developments mean that Missouri may be much closer to funding their state share at the level the model estimates is necessary based on FY2021 data.

Figure 27. Preliminary Results for Total Adequacy Funding, FY2021

FY 2021 Actual Revenue					
Sector	Adjusted State Funding (Excluding Line Item Approps, e.g, Extension)	Local Funding Not Covered Under Tax Rate Allowance	Total Adjusted State & Local Funding	Estimated Tuition Revenue	Total Funding from Adjusted State & Local Appropriations + Estimated Tuition Revenue
Four-Year	$692,413,668	$1,334,817	$693,748,485	$1,011,004,861	$1,704,753,346
Two-Year	$166,052,030	$161,775,201	$327,827,231	$141,001,332	$468,828,563
Total	**$858,465,698**	**$163,110,018**	**$1,021,575,716**	**$1,152,006,193**	**$2,173,581,909**

Adequacy Model Results						
Sector	Total Funding from Adjusted State & Local Appropriations + Estimated Tuition Revenue	Total Costs Estimated by Adequacy Funding Model	Surplus/Shortfall in Total Funding	Total Adjusted State & Local Funding	Given Cost-Share Targets, Estimated State & Local Funding Need	State & Local Surplus/Shortfall
Four-Year	$1,704,753,346	**$1,820,621,537**	-$115,868,191	$693,748,485	$814,666,190	-$120,917,705
Two-Year	$468,828,563	**$608,094,623**	-$139,266,060	$327,827,231	$430,364,351	-$102,537,120
Total	**$2,173,581,909**	**$2,428,716,161**	-$255,134,251	**$1,021,575,716**	$1,245,030,541	-$223,454,825

Note: Apart from data for headcount enrollments, which are used to incorporate a per-student cost for certain student populations into the variable costs component of the model, These figures in this table are all for FY2021 figures. The headcount enrollments are a three-year average for FY2020-22. Additionally, state funding totals exclude $58.7M in support for designated services being performed by specified institutions, usually in HB3 (e.g., extension, dedicated applied research projects). The total of local funding covered under the specified tax rate allowance threshold, and therefore excluded from revenue to be used in the model, is $17,302,177. Results for cost estimates are adjusted for inflation using HECA. No inflation adjustments are made to any of the revenue data, but the figures for state funding do not include ~$65-70M of additional state funding appropriated in FY2022, nor do they include additional investments in FY23 and FY24 of ~$50M and ~$70M respectively.

Source: IPEDS, MDHEWD, Missouri institutions

For the performance component, the estimates for the funding that institutions will be eligible for under this design is provided in Figure 28, assuming the value per point is set to be $50,000 (note that two of the metrics are awaiting data).

Figure 28. Tentative Performance Funding Amounts

Metric	Amounts
Point value (adjustable)	$50,000
Academic Progression	TBD
Completion	$10,173,983
Postgraduate Wages	$6,574,237
Efficiency	$8,930,775
Workforce Responsiveness	$8,357,500
Collaboration	TBD
Total	**$34,036,495**
Two-Year Institutions	$9,738,114
Four-Year Institutions	$24,298,381

At this point, it is worth recalling that the original motivation for this project was to develop a performance-based funding model for the State of Missouri. Yet, at least as indicated in the figures above, the amount of money going through the performance component of the model appears to be modest relative to the amount going through the adequacy component. However, there are elements of performance and incentives to drive efficient operation embedded throughout the model. In the frugal foundation, Missouri's institutions would be held to a standard for keeping administrative expenses below the national averages by sector. In the variable costs, the model takes a similar approach by reducing the cost per SCH that is recognized for the purposes of recommending funding levels. It also incentivizes institutions to improve student success rates by crediting them only for earned SCHs. But by acknowledging that some programs cost more than others to deliver, the model removes an existing impediment that discourages institutions from developing or growing relatively expensive programs. Such programs, like engineering and nursing but also sub-baccalaureate programs like advanced manufacturing, are often exactly the ones that produce graduates who are in the greatest demand in the labor market. Thus, performance is infused throughout the funding model, not just in the component that is labeled "performance."

Assessing Efficiency in Missouri Higher Education

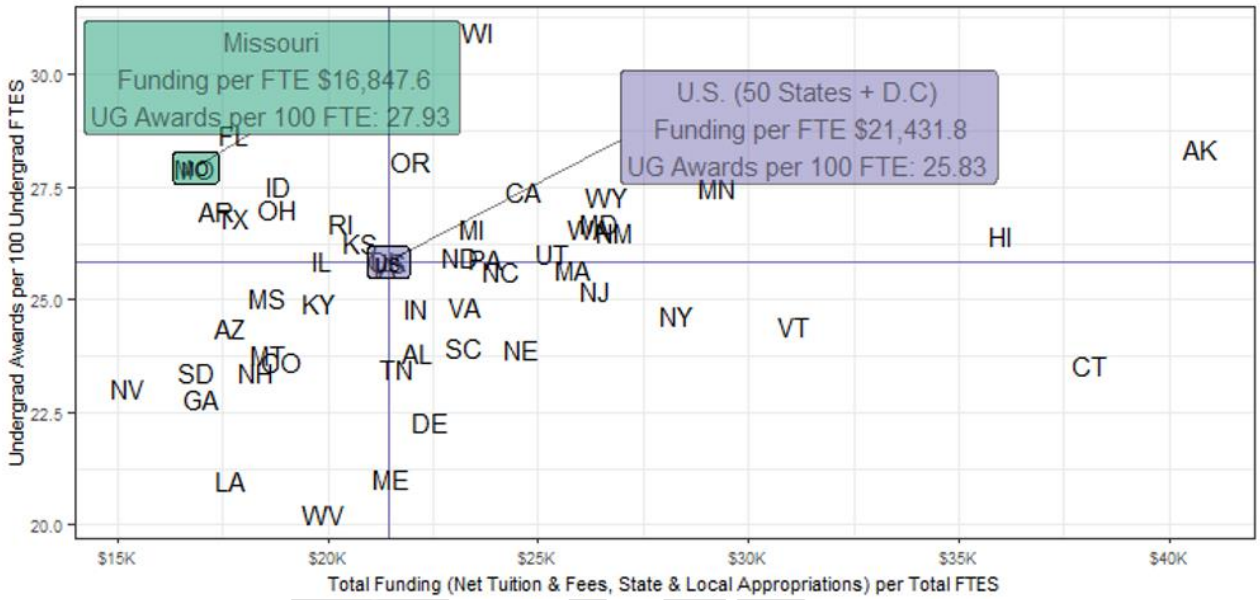
The second major component of the study required NCHEMS to examine how efficiently Missouri's institutions are operating and make recommendations for potential reforms that might lead to improvements in efficiency. Efficiency is typically defined as outcomes produced per unit of input. It can be improved by either increasing the outcomes produced with the same level of inputs or getting the same outcomes with fewer inputs (or some combination of the two). Typically, in higher education, efficiency is achieved by reducing costs in the provision of both administrative services and academic programs, but it can also result from increases in instructional outcomes produced through improvements in student success.

It should also be noted that, in order to make improvements in efficiency, additional short-term investments may be needed. Such investments may create new costs that persist over a longer timeframe, but any additional costs must demonstrate positive returns on investment. For example, a new strategy aimed at driving better student success rates may create additional expenses for the institution. But the strategy proves successful, those new expenses may be justified by the resulting increase in the efficient production of graduates. Improved efficiency can result from efforts undertaken within a single institution and from collaboration across institutions, such as through deliberate statewide planning efforts that improve coordination in the delivery of academic programs.

Benchmarking Missouri's institutions' performance against other states' (by sector) gives the first evidence of their efficiency. In Figure 29 through Figure 31, states' postsecondary sectors are compared on how well the convert students to graduates (awards per 100 FTE) relative to how much total educational funding they receive per student. On these scatterplots, being as far left and high provides evidence of efficient operations. These show that Missouri's public research universities are the among the most efficient in the nation. For example, for roughly the same amount of funding as

public research universities in Georgia receive, Missouri's generate roughly one-quarter more awards relative to enrollment. Similarly, about the same number of awards per student, Missouri's public research universities receive about $4,000 less revenue from state and local appropriations and tuition than Oregon's universities do.

Figure 29. Undergraduate Awards Productivity, Public Research Universities, FY 2021

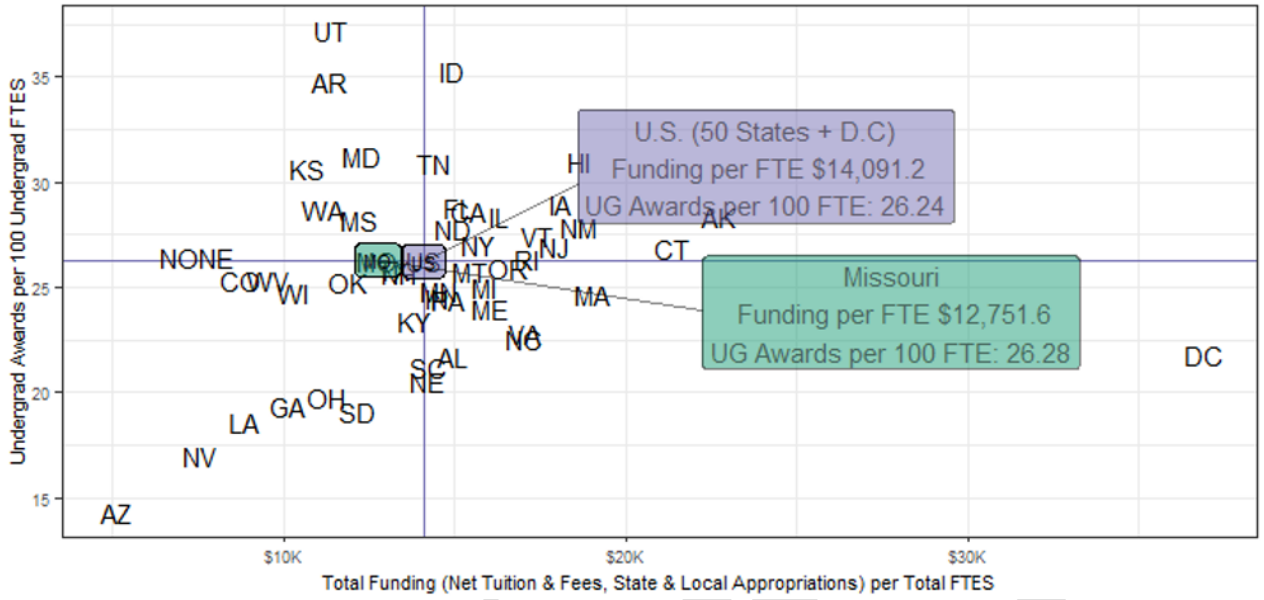


Source: NCES IPEDS.

Missouri's public comprehensive sector does not stand out quite as strongly as a national leader. But it still outpaces the nation in producing graduates relative to revenue, generating awards at a rate roughly equal to the national average but for about $1,000 less per student. By contrast, Missouri's public two-year institutions are slightly less efficient. As a whole, they produce awards at a lower rate, and also generate less revenue per student, than the national average. There are a handful of states where the two-year institutions appear to be operating more efficiently than Missouri's. Yet if one assumes that the relationship between productivity and revenue is roughly linear—that is, if Missouri institutions had more money they might improve their productivity rate—one might argue that Missouri's two-year institutions are, on the whole, at least not inefficient relative to the national average.[17]

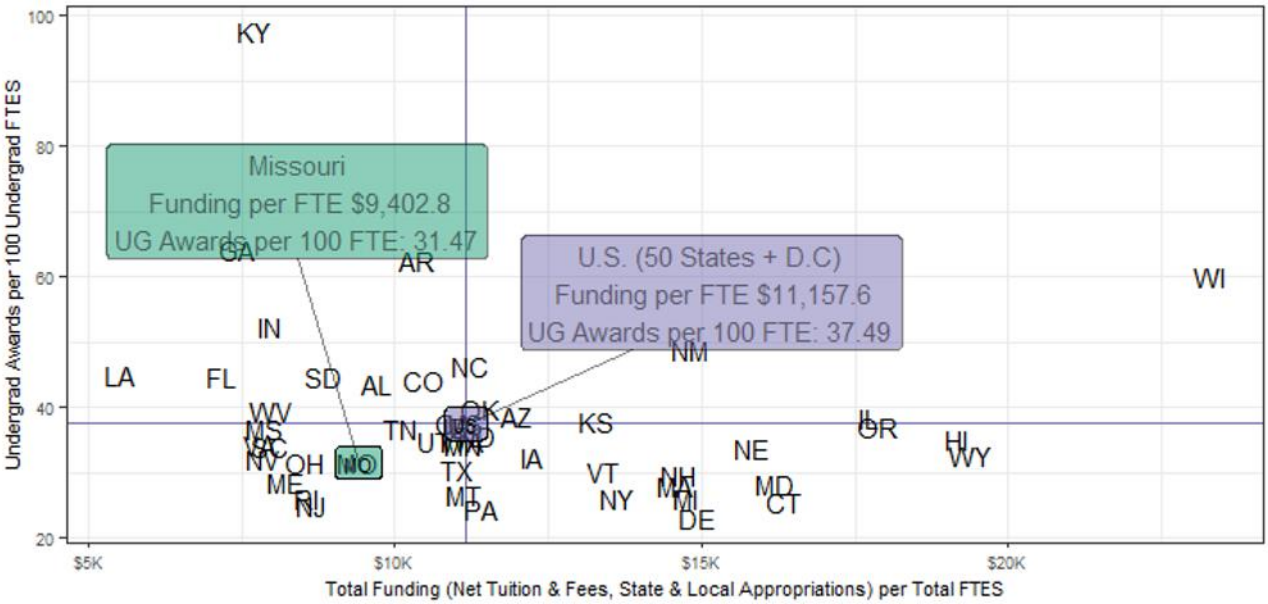
[17] Additionally and more so than the other two sectors, state policy regarding transfer and articulation can have an outsized impact on these results. States that have strong policies regarding the portability of the associate's degree incentivize students to complete those degrees prior to transferring, rather than transferring without one.

Figure 30. Undergraduate Awards Productivity, Public Comprehensive Universities, FY 2021



Source: NCES IPEDS.

Figure 31. Undergraduate Awards Productivity, Public Two-Year Institutions, FY 2021

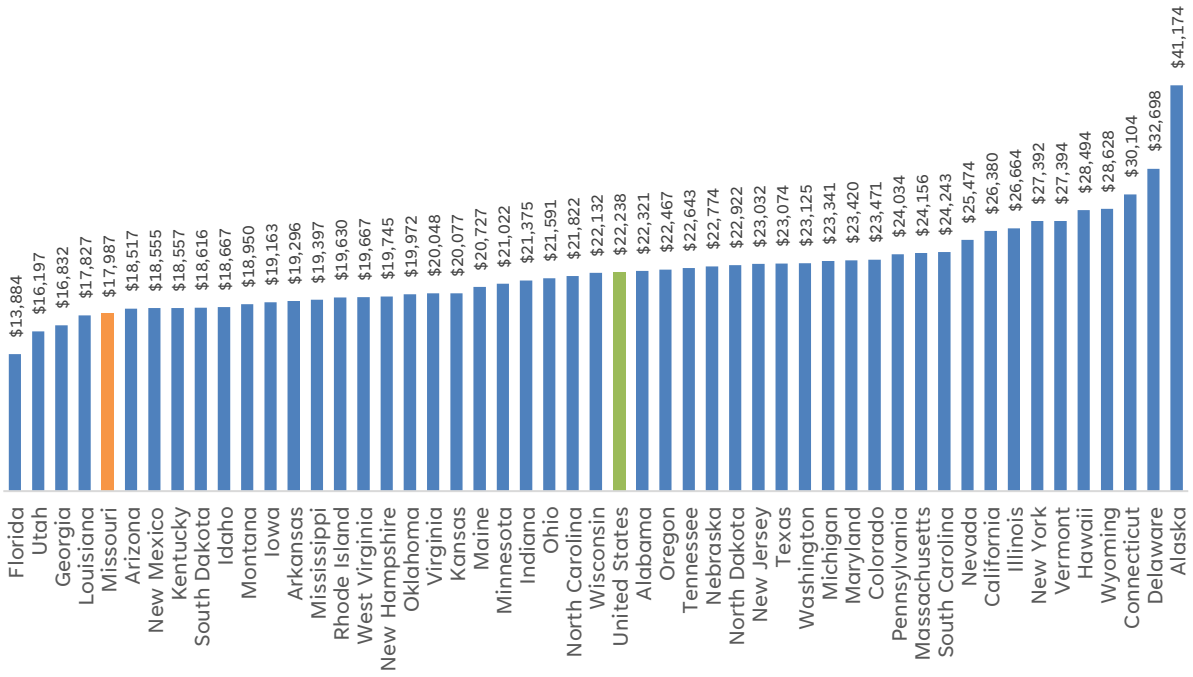


Note: Excludes Alaska.
Source: NCES IPEDS.

Other measures of efficiency provide similar takeaways. For example, taking into account all public institutions and normalizing the time it would take a full-time student to complete each degree (i.e., a bachelor's degree takes a full-time student four years to complete, so the costs for producing that

degree are weighted four times), Missouri ranks as the fifth most efficient state in the nation (Figure 32).

Figure 32. Education and Related Expenditures per Degree Year, FY2010-2019 (Ten-Year Average)



Source: IPEDS; HCM Strategists

Notwithstanding the evidence that Missouri's public institutions as a whole are relatively efficient in the production of degrees and credentials, there will always be a clear state need to keep costs in check. Therefore, our study sought to better understand how efforts to promote continuous improvement in efficiency could be made, either through the actions of the MDHEWD in coordinating higher education for the state, or through individual institutions.

Survey of State Agencies/Systems

With respect to the role that the state agency can play, NCHEMS partnered with SHEEO to develop and disseminate a survey to gather information about agency/system efforts to have an awareness of, promote, incentivize, and scale efforts to drive efficiency improvements among institutions. Thirty-five agencies/systems (from 34 states) responded to the survey. The following section summarizes responses received.

According to survey responses, there is considerable variation in the role agencies/systems play in efficiency improvements among their institutions.

Eighteen agencies/systems have established improved efficiency as a priority goal, seven with a target for savings. Eleven have formalized efficiency metrics (or are in the process of doing so). Metrics mentioned include:

- Time-to-degree.
- Access, retention, completion, graduation, and transfer rates (some consider specific student subpopulations and awards in certain fields differently).
- Core expense ratio; operating margin; and faculty to administrator salary ratio.
- Metering improvements and generation of renewable energy.
- Administrative cost savings (actual and cost avoidance).

Sixteen agencies/systems play a role in encouraging efficient operations at institutions. Seven pointed to their funding formula as a means for encouraging efficiency, four mentioned program approval and/or program review, four mentioned shared services, and one mentioned improved tracking and auditing in financial aid and in approving occupational schools.

Eight agencies/systems include efficiency metrics as a component of the outcomes-based funding (OBF) model. Metrics used included:

- Core expense ratio and faculty to admin salary ratio.
- Time-to-degree; awards per 100 FTE; graduation rate and transfer out rate for 2-year institutions; transfer-in rates for 4-year institutions; completions per FTE; graduation rate within 150% of normal time.
- Institution-determined 1-year and 5-year goals towards improving access, timely completion, and high yield awards.

Several agencies/systems have taken steps to increase their own awareness of operational efficiency initiatives at their institutions; ten require formal reports from the institutions. Six agencies/systems produce a report or maintain a clearinghouse of initiatives, four of which include an estimate of cost savings or reinvestment (one validates the reported amounts). In addition, there are examples of multi-institutional collaborations or partnerships in delivering academic or administrative services that respondents described. Among them are:

- Creating procurement efficiencies offered through system-wide procurement; for example, student information systems or other information technology functions, human resources functions, payroll, liability insurance, employee health care benefits, software to manage space utilization, property insurance, audit services, attorney services, and library services.
- Enhancing degree partnerships between public and private universities as well as universities and community colleges.
- Cultivating partnerships for increasing the number of rural health professionals through actions such as smoothing out the transition from associate of applied science technical degrees to Bachelor of Applied Sciences degrees in related fields.
- Administrative consolidations and alignments of degree plans.
- Establishing statewide financial aid agreements between all public institutions of higher education that allows students to take classes at multiple schools and have the credits

considered for financial aid, as long as the courses are applicable and transferable to the student's academic program or degree.

- Establishing a co-admissions/co-enrollment agreement among all public institutions allowing students to co-enroll both at a community college and a four-year institution, and immediately begin to work on a baccalaureate degree after earning their associate degree.
- Developing a consortium of Historically Black Colleges and Universities (HBCUs) designed to leverage personnel expertise and other resources across these institutions.
- Adopting a shared services model for internal audit, procurement, and risk management across four-year institutions.
- Benefitting from interstate efficiencies offered through a regional compact, such as the Midwest Higher Education Compact.
- Leading task forces to identify opportunities for better pricing on library resources and reducing energy use.
- Exploring joint delivery of foreign language programs.
- Exploring the joint establishment of a telehealth clinic to augment mental health services at each participating institution.

The survey also asked if, as a means of promoting efficiency in delivery across the states, there is explicit attention to differentiated institutional roles/missions that seeks to guide decisions about programs to be offered. Nineteen of 30 respondents indicated there was, most of which reported that the program *approval* process takes institutional roles/missions into account. Several also mentioned that the program *review* process takes institutional roles/missions into account, and one mentioned that facility requests are reviewed with campus role and mission and corresponding programs top of mind.

The survey also requested examples of policies or mandates that are "the most onerous barriers to efficient operation." These included:

- Procurement processes that are cumbersome (four mentioned this challenge).
- Reporting requirements that consume staff time (four mentioned this challenge).
- Variables in the state budget and a lack of political will among policymakers to fund higher education strategic priorities.
- Inability to issue general obligation debt.
- A lack of state policy to moderate tuition; this leads to institutions continuing to raise tuition despite increased state funding.
- Lack of a mechanism for institutions to join together in a consortium approach; barriers to entry are high because of a lack of adequate funding and staff.
- Overly complex and time consuming new academic program approval process.
- Collective bargaining agreements and their related politics.
- Lag times in maintenance and increased costs due to a portion of the physical plant being maintained by a state agency that supports the core operations of the state government.
- Capital project approval process.

- Prohibition from using design-build construction method for capital projects.
- Annual state budgets result in a lack of predictability in state funding.
- Compliance with debt financing obligations with the state treasurer.
- Requirements on personnel who are considered state employees for compensation and benefits.

Survey of Missouri Institutions

Leaders of Missouri's public institutions of higher education were invited to participate in the survey to help inform NCHEMS, MDHEWD, and the Missouri legislature about efforts being undertaken by the institutions to ease pressure on tuition prices, improve performance, and be effective stewards of public funding. We indicated in the introduction to the survey that the survey was not intended to gather comprehensive information on efficiency efforts since such an undertaking could require a significant institutional effort. Additionally, responses contributed to the context shaping the recommendations for a new model for funding public institutions that includes a performance-based component.

Nearly all of Missouri's institutions submitted a response to the survey, which included four survey items related to respondents' perceptions about institutional priorities and meeting those priorities. We found that institutions place a high priority on redeploying/allocating resources to better pursue institutional and/or state priorities and have successfully redeployed/reallocated resources to better pursue these priorities over the last 3-5 years (Figure 33).

Figure 33. Priority for and Effectiveness of Efficiency Initiatives in General

Question	Mean Score on 5 Point Scale
My institution places a high priority on redeploying/reallocating resources to better pursue institutional and/or state priorities.	4.76
My institution has successfully redeployed/reallocated resources to better pursue institutional and/or state priorities over the last 3-5 years.	4.84

We also asked about more specific areas that the institution places a high priority on and how successful the institution has been at improving effectiveness in those areas (Figure 34). The responses are summarized in the following table. Notably, respondents mostly agreed these are areas that are prioritized to a greater extent than they agreed these are areas the institution has been successful at improving effectiveness in. There seems to be interest in continuing to make improvements in these areas and areas where room for improvement is greatest, across the institutions, are in reducing administrative operating costs to make investments in enhancing institutional and increasing graduation rates of underrepresented minorities (URM). (In subsequent listening sessions with institutions, one person commented that the reason their confidence in

successfully achieving cost reductions is relatively may be because they have already cut so much excess funding out of the institution that it is a challenge to find more.)

Figure 34. Mean Reported Scores on Priority for and Effectiveness of Specific Efficiency Initiatives

Area	Institution places a high priority on	Institution has been successful at improving effectiveness in
Improving student affordability	4.64	4.60
Improving student success for all students	4.88	4.60
Increasing URM enrollments	4.68	4.36
Increasing URM graduation rate	4.80	4.12
Reducing administrative operating costs to make investments in enhancing institutional quality	4.64	3.48
Meeting local, regional, or state needs for educated workers in high-demand fields	4.68	4.56
Having a positive impact on economic development and civic well-being	4.80	4.68

Note: Scores are on a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

NCHEMS has developed a short list of good practices regarding approaches to achieving efficiency and effectiveness in college and university operations. This list draws from reports of efficiency initiatives in other states—most notably Ohio and Texas because of the focus these two states have had on efficiency—as well as the national survey of chief executives of all State Higher Education Executive Officers (SHEEO) agencies, and the survey of Missouri public colleges and universities that requested examples of their practices aimed at producing more efficient operations. It also borrows from a long history of involvement with scholars and practitioners working on enhancing the benefits provided by higher education systems. Common challenges to implementing efficiency initiatives include inconsistent buy-in among leadership of participating institutions, agencies, organizations, etc.; lack of staffing and other resources to create and sustain the partnership; lack of clarity around the goals and expectations; and competing and evolving priorities and goals.

Practices worthy of being considered for adaptation in other institutions that emerged from this review take two distinct forms. First are those that involve changing structures and practices inside a single institution; the second are practices that involve multiple institutions/partners. The following sections present broad categories of good practices for increasing efficiency and examples of related actions that Missouri colleges and universities are taking.

Good practices within institutions include steps such as:

- Making changes to organizational structures by combining departments/offices and thereby saving on managerial costs.
  - One community college noted they have embedded clinical internships cost savings through having local health care providers provide supervision for clinicals while students are employed (with pay) instead of having to pay adjuncts to supervise clinicals. In addition to cost savings, this model provides a more direct route to employment for graduates.
  - Some institutions have implemented a Voluntary Retirement Incentive Program, which offers an incentive to those eligible to retire and leads to a reduction of compensation and benefits.
  - Several institutions have combined departments/offices thereby reducing managerial costs and increasing cross-training.
- Monetizing physical assets through leasing unused space or selling assets that aren't needed.
  - One institution is leasing a cell tower to wireless carrier for $25,000/year.
  - Some institutions noted they have sold or demolished unused facilities.
- Conducting energy audits, investing in climate control systems that yield on-going savings, switching to LED lighting, etc.
  - Several Missouri institutions are taking steps in this area, with many making improvements in HVAC and lighting to reduce costs. One example is Missouri University of Science and Technology's project that began in 2015 supported by tax credit and grant funding sources. Results from the project include elimination of deferred maintenance of a 40-year-old coal and wood chip fired steam boil and power plant; expansion to a two-pipe chilled water system; as well as decreasing the campus' carbon footprint by up to 57 percent. There was a financial impact from the project as well including $1.2 million in savings of operation costs due to a reduction in BTU usage of 60 percent as plus a reduction in deferred maintenance of $60 million.
- Improving academic productivity through elimination of small classes, revisions to curricula, etc.
  - Several institutions noted they have a new hy-flex delivery method allowing them to maximize class capacity instead of having several smaller sections with individual course delivery methods. Hy-flex gives students the flexibility of taking a course online asynchronously, face-to-face, or via webinar and to be able to attend in any of those modes throughout the semester.
  - Several institutions mentioned they have made changes to program offerings based on findings from academic program review. For example, one noted they have discontinued Occupational Therapy Assistant AAS degree program due to unsustainable enrollments; they entered teach-out this year. Another mentioned they implemented curriculum

audits to ensure all curriculum and programs are accurate and current; this process resulted in a reduction in credit hours required by some programs.
  - An institution is implementing new scheduling software to better predict needed sections.
- Reducing time/credits to a degree for students.
  - One community college noted they re-sequenced/reduced courses in HVAC, Paramedic, and Medical Assisting programs to shorten time to graduation.
  - Another institution mentioned they have begun requiring faculty to notify students about grade concerns and available resources a quarter into the course.
  - Several institutions mentioned they have implemented a Guided Pathways advising system through which students are assigned to Advising Specialists based on their program of study.
  - An institution is offering a professional licensure/teacher certification available through fully online program in teacher education. The program targets paraprofessionals in schools and allows them to continue to work while earning their degree.
  - Another noted their efforts to increase the acceptance of military credit for acceptance toward degree requirements.
- Automating processes, decreasing data entry errors and processing time.
- Entering into campus-wide purchasing contracts for high-volume goods and services.

More consequential are those steps that are collaborative actions on the part of multiple institutions/partners since economies of scale are more likely. Most examples of such collaborative practices involve administrative functions such as developing shared services arrangements for:

- Student services functions
  - A community college noted they contract with local and regional offices for providing mental health counseling services as well as emergency services.
  - There is a multi-institutional partnership to offer crisis counseling to employees by housing a full-time counselor at one of the partnering institutions.
- Purchasing
  - Missouri has a state-wide cooperative procurement program called MissouriBUYS.
  - With efforts beginning in 2009 the four universities of the University of Missouri System and MU Healthcare consolidated procurement functions into a central structure to drive efficiency and expand services. The University of Missouri System universities along with MU Healthcare between 2019 and 2022 saved $33M by contracting as a single procurement entity.
- Professional development
  - An example of a multi-institutional partnership in this area is the Leadership Academy Partnership Agreement between Mineral Area College and Jefferson College through which 10 employees at each of the two institutions participate in quarterly professional

development activities that are focused on leadership. The academy is offered every other fiscal year.

- Administration
  - Permanent staff reductions as a result of the consolidation under the University of Missouri System resulted in cost savings of several million dollars.
- Disaster recovery
- Risk management
- Financial records and processes
- Student record systems
- Facilities and construction management
- Cybersecurity and related insurance
- Research oversight and compliance
- Compliance with federal regulations
- Help desks and other student support functions
- Major aspects of information technology service delivery and policy development

Less common but holding promise, both for generating efficiency and enhancing services to students, are those collaborative arrangements that involve academic programs in some way. These can include:

- Joint offering of academic programs in some manner—the program being taught by faculty from multiple institutions with students enrolled from all participating institutions. An alternative has a program being offered by a single providing institution to students enrolled at other institutions (with student services being provided by the receive site institutions).
  - The Missouri Health Professions Consortium allows participating institutions to offer programs to their students that the individual institutions would find cost-prohibitive to offer on their own.
  - Several Missouri institutions mentioned partnerships with school districts, industry, and foundations that are aimed at improving career readiness for students. For example, SEMO partnered with the US Aviation Group (USAG) and the Cape Girardeau Regional Airport for its Professional Pilot program. USAG provides management services for the professional pilot program. Classroom training for students takes place at the Southeast campus. Flight training, simulator and other related training take place at the Cape Girardeau Regional Airport where USAG has aircraft, training devices and personnel. Another example is the Respiratory Therapy program offered through a consortium between Missouri Southern State University and Franklin Tech Center of Joplin Public School system. Franklin Tech provides salaries, MSSU provides spaces, equipment, and overhead.
- Joint operations of library services—purchasing of information resources and sharing of those resources.
  - Several Missouri institutions noted that faculty develop materials and textbooks, and faculty curate materials to reduce costs for students through the Open Education Resources (OER) initiative.

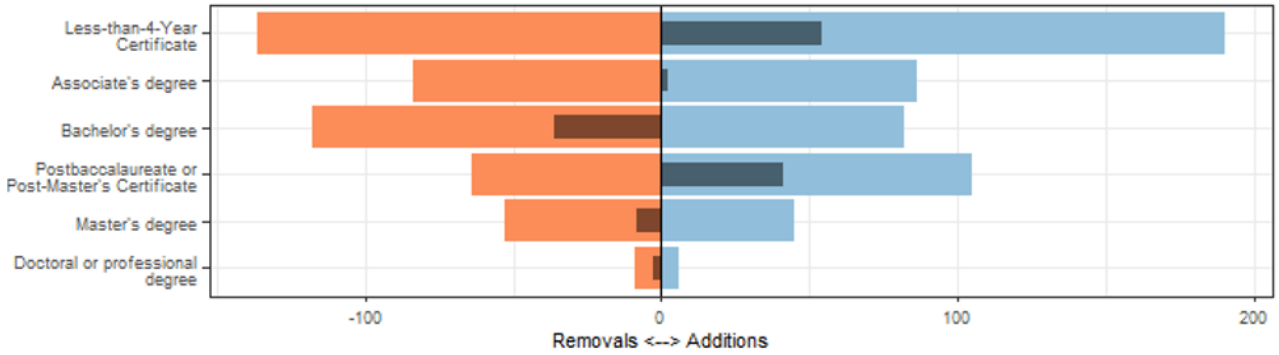
- Broad-scale articulation arrangements that include a core general education transfer curriculum under which courses are automatically accepted as meeting the gen ed requirements at all public institutions in the state. Such agreements help to avoid unnecessary credit accumulation by students who transfer.
  - Missouri has a core transfer curriculum known as CORE 42. Individual courses that comprise the CORE 42 are guaranteed to transfer one-to-one among all public (and participating independent) colleges and universities in Missouri.
  - Missouri institutions shared information about other instances of articulation agreements and transfer pathways they have developed.
- Research consortia
  - There were no reports of such partnerships among Missouri institutions in the survey responses received. But other states are home to research collaborations that might serve as a useful model. One such example is the Virginia Catalyst, a 501(c)(3) created by Virginia's legislature and supported with state funding (https://www.virginiacatalyst.org/).
- Joint development of infrastructure for on-line education.

In summary, Missouri institutions are engaged in improving efficiency through actions within their institution as well as in collaboration with other institutions and other partners. However, there are additional steps that could be taken by Missouri institutions, but these steps will require MDHEWD—or some other intermediary organization—to play a much more active role, and may require increased resources to effectively support these initiatives. These additional steps, that are consistent with good practice, involve expanding collaborations to include a broader array of administrative functions and a greater emphasis on academic and student service functions. On the administrative side there are opportunities for efficiencies in expanding shared services arrangements to include more functions (payroll, accounts receivable, accounts payable, student records, billing, etc.) and more institutions. Similarly, there are numerous national examples of arrangements in which academic programs are shared across several institutions. It is noted that most of these examples are found in institutions that are part of governance systems, but they are also found among private non-profit institutions.

Academic Programming

In addition to the results of the survey, NCHEMS also examined the academic programming at Missouri institutions and how it is changing. This was conducted in response to concerns of excessive duplication of programs, one that comes amidst a backdrop of declining enrollment both in the recent past and anticipated for the future in Missouri. One common response among institutions seeking to preserve or improve enrollment levels is to mount new programs aimed at attracting new students, so it is not unreasonable for questions to be raised about how best to meet student and workforce needs under these conditions. In any case, our review of the data suggests that there is considerable movement among Missouri's institutions as they seek to be responsive to student or workforce demand. For example, between 2017 and 2021 there has been a clear shift in programming away from academic degrees (bachelor's, master's, and doctorates) in favor of certificate programs (Figure 35).

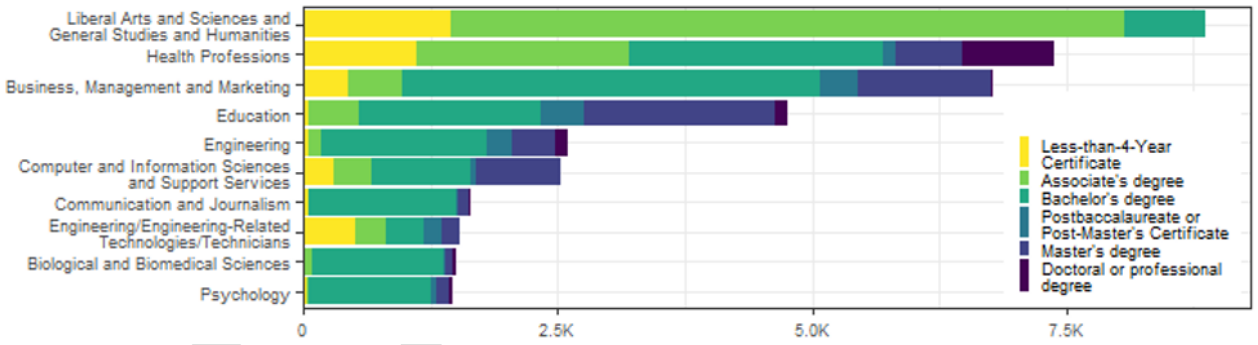
Figure 35. Statewide Program Additions and Eliminations by Level, 2017-2021



Note: Darker bars indicate the net of additions minus eliminations.
Sources: NCES IPEDS and MDHEWD

A similar look at changes in the array of programs by discipline also indicates evolution in what is being offered at Missouri's campuses (Figure 36). As is common, the most common field for which degrees are awarded in Missouri is in the Liberal Arts and Sciences and related transfer-oriented programs. Awards in the next most popular fields are in health professions, business-related programs, and education programs.

Figure 36. Statewide Awards by Disciplinary Cluster, 2019-2021 (Three-Year Average)

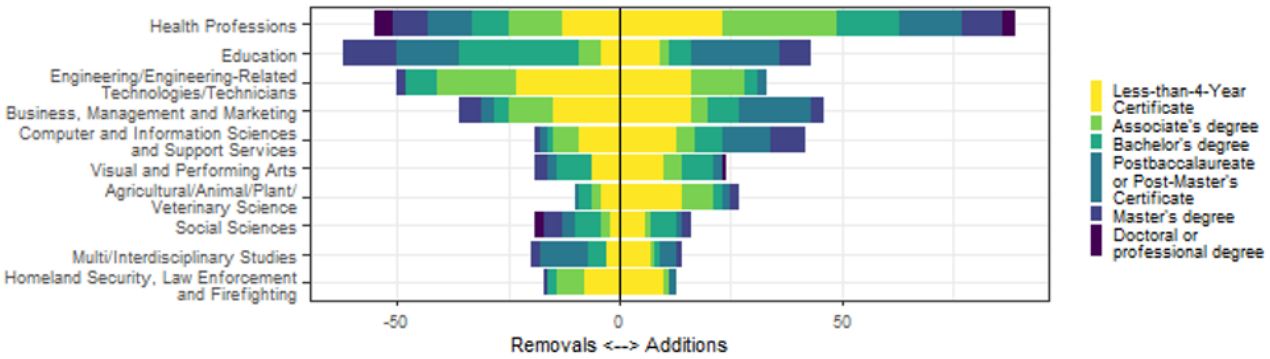


Note: Data are for the 10 most common disciplinary areas. Disciplinary clusters are defined by two-digit CIP codes. Graduate degrees in the liberal arts are typically not awarded in the "Liberal Arts" CIP code, which is why they do not appear on this graph.
Source: NCES IPEDS

Looking at the evolution of the statewide program array suggests a considerable amount of change. Health professions, followed by education, and engineering fields, are the most common fields to see large incidence of new programs and program closures (Figure 37). A careful look at each respective bar can indicate how the educational supply is shifting. For example, in the health professions, there are more programs leading to sub-baccalaureate certificates, associate's degrees, bachelor's degrees, and post-baccalaureate certificates than in 2017. In education, there are fewer programs overall, especially among bachelor's degrees. The evolutionary patterns in what programs are being offered are intriguing at the state level, but they can provide particular insight

about how institutions are responding to perceived demands and whether there is reason for concern that they have begun operating out of their respective lanes.

Figure 37. Statewide Program Additions and Eliminations by Disciplinary Cluster, 2017-2021

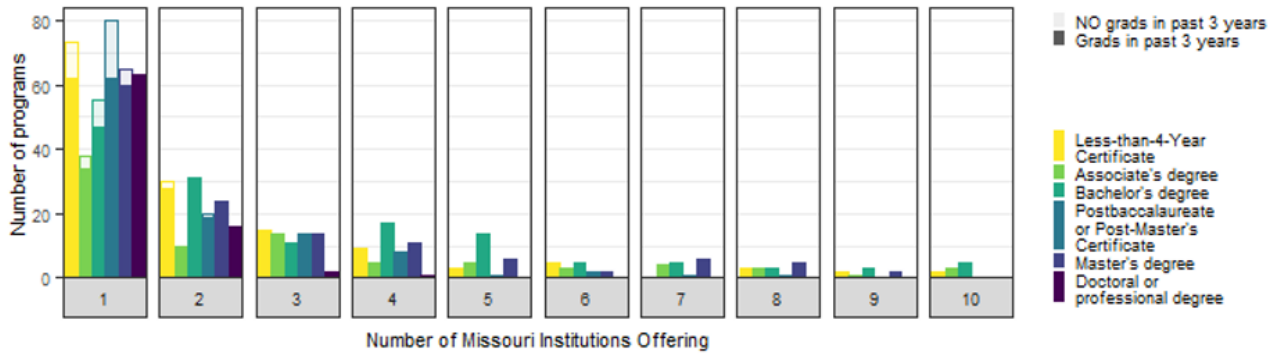


Note: Data are for the 10 disciplinary clusters that experienced the most change. Additions and eliminations are identified at the six-digit CIP code level.
Source: NCES IPEDS; MDHEWD

Even with so much change in the program array being offered at Missouri's public institutions, there is little evidence to suggest that duplication is a widespread problem, yet. Although it is not uncommon for two institutions offering the same program (as defined by CIP code) across all levels, there are very few programs at the graduate level that are duplicated among Missouri's institutions (Figure 38).[18]

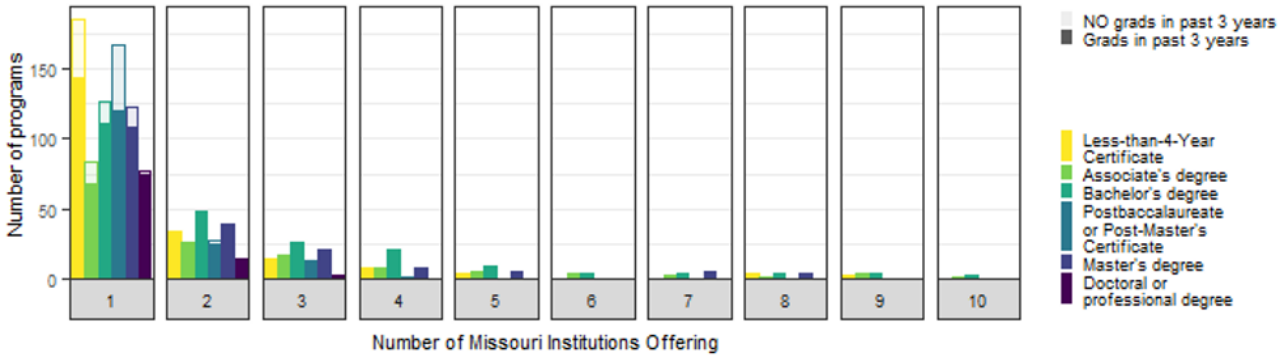
[18] A version at the same graph looking for duplication at the four-digit CIP code level, which categorizes programs at a less specific level than do six-digit CIP codes (e.g., under Microbiological Sciences and Immunology (CIP 26.05), there are eight six-digit codes such as Virology (26.0504) and Parasitology (26.0505)) reveals a similar pattern. Since there are fewer programs overall to graph at the four-digit level than at the six-digit level, the scale has changed. But the relative prevalence of similar programs is largely the same as the six-digit graph.

Number of Missouri Institutions Offering a Similar Program (4-Digit CIP)



Source: NCES IPEDS

Figure 38. Number of Missouri Institutions Offering a Similar Program, 2020-2021



Note: Each program is defined by six-digit CIP codes. There are an additional 16 programs offered at more than 10 institutions.
Source: NCES IPEDS

There are, however, programs being offered at more than 10 of Missouri's public institutions (Figure 39). These tend to be programs at the baccalaureate level or below and are commonly either programs that grow out of typical general education curricula—and typically are relatively less costly to offer—or are occupationally specific, such as nursing, which is also a field that is experiencing chronic undersupply to meet the demands of the workforce. Given that undergraduate students are more likely to expect to find a suitable program nearby, or are place bound, and given that the annual costs of offering a program mount as the level rises (i.e., doctoral programs are more expensive than bachelor's programs in the same subject), these analyses do not currently substantiate the need for grave concern over the most problematic forms of program duplication. However, the need to keep tabs on what institutions offer to whom will likely be an important task for Missouri's coordinating board as institutions face a tightening market for prospective students, as well as to ensure that the state's employers' needs for talent are being met in the most efficient manner.

Figure 39. Programs Offered at More than 10 Missouri Institutions, 2020-2021

Note: Each program is defined by six-digit CIP codes. There are an additional 16 programs offered at more than 10 institutions.
Source: NCES IPEDS

Conclusions

The results of these analyses, together with experience drawn from similar projects in other states, lead to a set of conclusions concerning state funding and efforts to promote operational efficiencies in public higher education in Missouri.

A Coherent, Rational Policy for Funding Public Institutions

Ideally, a state funds its institutions in a coherent and rational manner—one that directs money to institutions in a way that is designed to assure that the assets represented by institutions are preserved and their value enhanced; provides financial support at a level adequate for each institution to offer its mix of programs to the specific populations of students it serves; is sensitive to the reality that institutions respond to incentives presented by a variety of revenue sources, not just direct appropriations from the state; and aligns state investments with state priorities. In the Missouri context, state funding for higher education should support all Missourians with accessible pathways to the training they need to be competitive in the 21st century workforce.

Currently, Missouri does not fund its postsecondary institutions in this way. The current incremental approach to funding fails to best position its public institutions to meet state goals, regional goals, or the needs of its students. In fact, this approach has to be supplemented by good-faith negotiations among its institutions in an attempt to ameliorate funding inequities that emerge from that incrementalism. Although it may have been tolerable under conditions of consistent growth in the college-going population, continuing to fund its institutions this way will become an ever more serious problem for the state as demographic shifts and financial pressures impact its institutions. The existing approach fails to adjust effectively to real changes in enrollment and in the demand for workforce-relevant programming (among students and employers) and provides few meaningful incentives for institutions to work toward the achievement of state goals. Enrollment pressures at some institutions (and less so at others) will eventually require intervention by policymakers to create a funding approach that is loosely related to actual, verifiable needs. This will fuel inefficient operations that worsen affordability challenges for students, particularly those whose ability to access educational opportunities is least assured and whose education is needed to meet workforce needs. In short, Missouri has wrung whatever utility there was out of its Base-Plus funding approach. It is time for a new approach.

The focus of the RFP that launched this project was to develop a performance funding model for Missouri, one that established and rewarded institutions based on their achievement of certain outcomes related to student success and fulfillment of talent needs in the workforce. However, an institution can only effectively perform if it can rely on a coherent and predictable funding core. Without that foundation, performance funding models are likely to produce suboptimal outcomes at best and, at worst, exacerbate funding inequities among institutions and erode access to relevant programs for students.

Accordingly, it is essential that such a well-designed funding policy first recognize that the state has an obligation to its taxpayers to effectively leverage its institutions—as state and local asset—to

meet state, regional, and local needs. Thus, the state (in combination with local governments which help fund and govern Missouri's community colleges) is obligated to fully cover the minimal costs of preserving the value of those assets—the state-owned collection of physical and intellectual property and real estate embodied in each public institution.

With that bare minimum obligation accounted for, the funding policy should also recognize and be designed to address the meaningful differences in the varied educational and business models of Missouri's public institutions—what they teach to whom, and what other critical services they deliver to the state and its residents. At the same time, the model should embed elements that encourage institutions to avoid unnecessary expenditures and to strive for operational efficiency; these reduce the cost burden students share or bolster student success and other important outcomes.

With respect to sharing educational costs with students, the funding model must be sensitive to the varied capacity of institutions to generate revenue through tuition and other private sources; failing to do so will cement funding inequity in the model, an outcome that is all but certain to disadvantage institutions that disproportionately serve the students for whom improved success rates will have the greatest impact on the achievement of state goals. Such a model must also be driven by evidence more so than by political connections and historical trends that increasingly no longer have merit. In effect, what Missouri needs is a funding approach that allocates funds in a way that meets a frugal adequacy standard to meet institutional needs for revenue, while simultaneously creating incentives that drive continuous improvement.

Any new funding model must be thoughtfully implemented over the course of 2-3 fiscal years. It helps to remember that the subsidies public institutions receive are what allows them to charge students less than what their education costs. Excessive volatility in state (and local) funding—in general and that created in the wake of a substantive change in the funding approach—creates challenges for institutional budgets that impacts students. Institutions require time to analyze and respond to incentives in a new funding model and, although they should not be completely shielded from the results, policymakers will get better results if they allow for a deliberate rollout of the changes that protect institutions from unduly large changes to historical funding levels.

Finally, an overhaul to a state funding model is also far easier to implement when state budgets are relatively flush than during a downturn. Just as has been the case in the three decades that Missouri has relied on base-plus funding, a time will come when the economic conditions strain the state's ability to fully fund the model. In such episodes, a well-designed funding model offers the state a sophisticated tool to ration available funding in ways that deliberately prioritize state needs with data and evidence informing those decisions.

Based on our simulations using our proposed parameters, Missouri is not funding its public institutions at a level adequate to institutions' abilities to fulfill their missions. This appears to be the case even before the state makes any attempts to incentivize performance improvements by adopting a new performance funding policy. Furthermore, the extent to which the state portion falls short of its commitment to fund its institutions varies considerably. This means that Missouri's public colleges and universities are compelled to seek revenue from students to close the gaps in funding

needed to function effectively and efficiently. But their ability to do so is not uniform, leading to issues of institutional funding equity.

Efficiency

With respect to operational efficiency at Missouri's public institutions, the findings are much brighter: any objective review of the top-line data on efficient operations in comparison to other states would find that Missouri should be justifiably proud of its public institutions to produce degrees and certificates at a relatively low cost. This is especially true for the state's research universities.

Missouri's public institutions are engaged in improving efficiency through actions within their institution as well as in collaboration with other institutions and other partners. For example, within institutions, there are efforts to: save on managerial costs through restructuring; monetizing physical assets; reducing energy expenses; improving academic productivity through making changes to academic program offerings based on findings from program review; reducing time to degree; and automating processes. Missouri's public institutions are also partnering with other institutions and other partners to make arrangements for shared services in student services functions, purchasing, professional development, and administration. Notable examples of collaborative arrangements in Missouri that involve academic programs include:

- the Missouri Health Professions Consortium allows participating institutions to offer programs to their students that the individual institutions would find cost-prohibitive to offer on their own and
- several partnerships with school districts, industry, and foundations aimed at improving students' access to and success in academic programs, and career readiness.

Yet there is a state interest in promoting further improvements that can lead to improved affordability and student success outcomes; our review suggests several possible paths forward. A first option is to follow the lead of other states and incorporate an efficiency metric in the state's performance funding model. A second option is to promote collaboration among institutions in providing administrative services and in delivering academic programs. There are promising signs that Missouri's institutions are moving in this direction already, as previously indicated, but barriers to inter-institutional partnerships—as well as other partnerships (e.g., with employers) that could yield benefits to the state and its students—are many and often entrenched. Missouri's coordinating board has limited authority to compel participation in multi-institutional partnerships, however, as it has no direct control over the behavior of institutions. Nevertheless, it does enjoy statutory authority to review and approve academic programs, to develop a statewide strategic plan, and to recommend budgets for higher education to the legislature.

There is scant evidence that program duplication is currently a severe problem for Missouri's institutions. However, the intensifying competition for students will create pressure on institutions to develop new programs as recruitment tools more so than out of a need to respond to workforce demands. It is clear that program offerings are evolving at campuses throughout the state, yet it is less obvious that the state is particularly conscious of these changes or how they might impact the

costs of operating institutions individually or collectively. The challenge for the state coordinating board will be how to balance its responsibility to ensure state investments are wise, responsive to needs, and sustainable in ways that avoid introducing barriers to institutional nimbleness and innovation. One way out of the inevitable tensions that will arise concerning these decisions is for the state to more consciously foster productive collaborations among institutions to share administrative services and to jointly deliver academic programs. Missouri institutions have shown creativity in independently developing some collaborations, but a state commitment to incentivizing such activity could accelerate these innovations that can simultaneously drive efficiencies and enhance services, especially to populations that may be hard to reach.

Recommendations

This section contains recommendations made by NCHEMS to both the Missouri General Assembly and to the Coordinating Board for Higher Education and the Department of Higher Education and Workforce Development.

Recommendations to the General Assembly

Based on analysis of Missouri data and drawing on what NCHEMS considers to be good practices from other states, we make the following recommendations to the General Assembly:

1. The legislature should enact into statute the broad general framework for a funding model as guidance to MDHEWD for its annual budget submission to the legislature. The statute should indicate the broad components of a funding model, but not be more prescriptive. The task of adding details should be left to the Department. The following broad components should be included in the framework (these components are fully described in the section in this report on the Conceptual Framework):
    a. Fixed Costs
    b. Variable Costs
    c. Performance
    d. Funding for important functions not included in the funding model—a recognition that there are some items that will require line-item funding, such as:
        i. Medical Schools
        ii. Land Grant functions
        iii. Specific, dedicated activities conducted by institutions on behalf of the state, such as applied research projects, where an institution is effectively a "preferred vendor" for the state for that activity.
        iv. Other important functions outside of credit-bearing instruction.[19]

[19] Among the functions that likely require funding support at present is some amount of non-credit programming that leads to workforce-relevant and industry-recognized credentials. Ideally, such activity would be covered under the variable costs component of the model, but current data limitations prevent

e. Funding for building high priority new educational capacity—for example, short-term seed money for the creation of new academic programs that are important to workforce and economic development priorities of the state. This includes funding provided through the MoExcels program, a recurring program that supports new education and training programs offered in partnership with employers to meet Missouri's workforce needs. It also includes one-off investments in capacity that are the product of negotiation between policymakers, MDHEWD, and individual institutions.

2. Establish expectations that the model be designed using a cost-based approach in which the formula yields an estimated total amount of funding required to serve each institution's instructional mission. This approach stands in contrast to the current allocation method that simply adjusts the state's appropriation to each institution by the same percentage, with the institution's total revenue determined by the additional funds it can raise through tuition and from other, private resources. The model being recommended by NCHEMS calculates the funding level required for the institution to be sustained as a state asset and to fulfill its mission—to offer its array of programs and to help its particular mix of students succeed.
3. The performance component of the model should be treated as an element of the funding model that is additional to the base adequacy (fixed plus variable) elements described above. During each legislative session, upon the recommendation of the Department, the legislature should establish a fixed dollar value for a performance point.
4. The legislature should direct the Department to prepare a set of recommendations regarding how costs are to be shared among the state, students and local taxing districts for consideration and adoption by the legislature.
    a. The share of the calculated costs to be borne by students should be determined in a way that ensures that affordability is not only maintained but improved. The share to be borne by students at those institutions that attract more out-of-state students and students from more affluent families should be higher than the share borne by students in institutions that serve those of lesser means.
    b. A formal policy should be developed that determines the share of institutional costs estimated by the funding model to be borne by the local taxing district of each community college. As noted earlier, Missouri's Community Colleges are local, not state, institutions with locally elected boards and the power to levy taxes on the assessed valuation of the real property within their taxing districts. However, they make substantial contributions to the state goals of education attainment and workforce participation. In recognition of this contribution, the state has consistently provided funding to support the on-going operations of these colleges. Given the role

Missouri from accurately capturing the scale and scope of those programs at all institutions. A recommendation to gather better data to understand this activity is included in this section.

and history of local funding, it is important to incorporate funding from local sources into the state funding model, but to do so in a way that does not create perverse incentives.

Unlike most states that have locally controlled community colleges, the taxing districts of community colleges do not cover the entire state and in most cases do not encompass the entirety of the geographic area the colleges are expected to serve (their service area). In the most extreme example, a college has a service area that extends to 17 counties and a taxing district that encompasses a single school district. In other instances, particularly the larger districts, the taxing districts and service areas are co-extensive. Colleges are allowed to charge out-of-district tuition to students who attend their college but live outside the taxing district in order to alleviate the cost burden on property owners in the taxing districts.

The funding model used by the state must accommodate local funding in a way that recognizes the reality of this funding stream while not creating incentives for local districts to minimize their fiscal contributions. For initial discussion purposes it is proposed that:

- The state portion of state and local funding support will be determined by subtracting the local funding from the commitment expected of state and local funding by the funding model based on the cost-sharing targets.
- Local funding support levels will be bounded by minimum and maximum amounts according to these provisions:
  - The current tax rate at each taxing district will be "locked in" to ensure that districts have no incentive to offload their contributions to the state by reducing their taxing rates. For example, the taxing district for East Central College taxed its residents' property at a rate of 0.3482 in FY2021.[20] Any decisions to reduce this rate made by the taxing district in future years would not be recognized in the model; the expected local contribution would remain at a minimum of 0.3482 times the assessed value of property.
  - The expected local tax assessment rate will be capped at some level (for example, establishing a cut-off at the level of the top quartile in use among all Missouri's taxing districts). This provision would serve to ensure that local taxpayers are not penalized for increasing taxes that more generously fund their colleges by seeing any new dollars substitute for state dollars. In other words, the model should not recognize the portion of local revenue collected by each institution that exceeds the amount that would be generated by the rate cap times the assessed value of property. (This provision is why there is

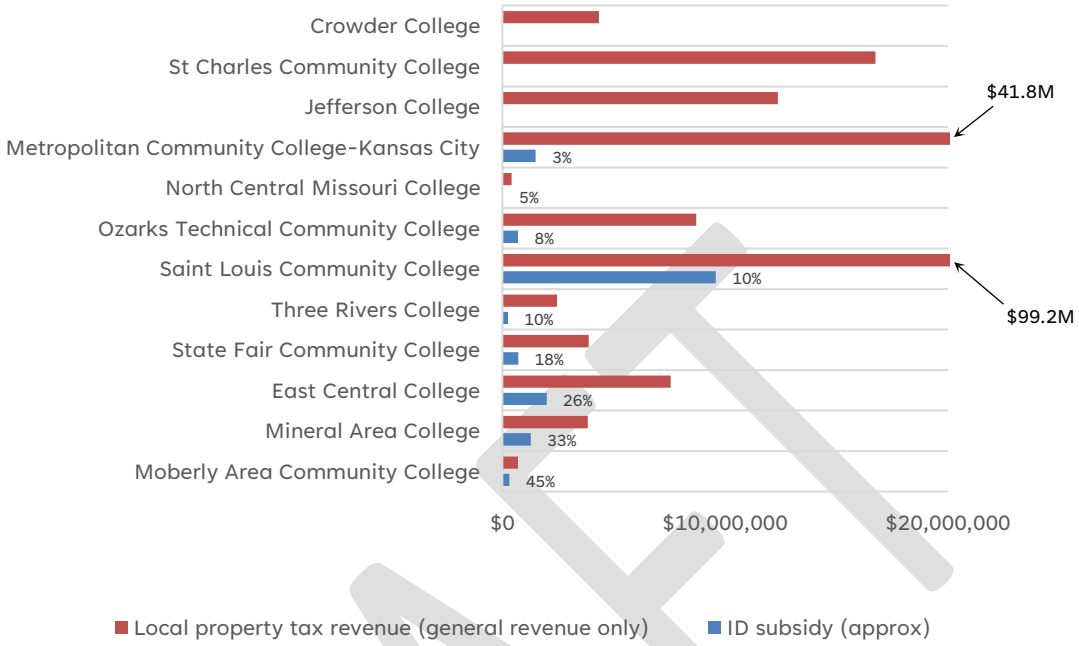
[20] Missouri State Auditor.

$17M of local tax revenue excluded from the model results depicted in Figure 27 on page 49.)

- Additionally, the state should consider developing a policy that equalizes tuition payments for in- and out-of-district students, with the local governments that have elected to remain outside of all institutions' taxing district covering the difference for the students residing in their jurisdictions.

A portion of local tax revenues is used to subsidize lower in-district tuition rates for residents of each community college's taxing district. An additional option for the funding model is to calculate the value of those subsidies, and to apply that amount of local tax funding towards the tuition-funded share of the variable costs. This option would effectively consider some of the local tax revenue to be "tuition" that local taxpayers are paying on behalf of local taxing-district students. The remaining local tax dollars could then be allocated towards the model as indicated above. The value of these subsidies varies substantially by college, both in terms of overall dollars and also percentage of tax revenue, from only three percent of local tax revenue at Metropolitan Community College to 45 percent of local tax revenue at Moberly Area Community College. Please note that the subsidies in Figure 40 are approximate.

Figure 40. Local Tax Revenue vs. In-District Tuition Subsidies, 2022



Note: The chart above excludes Jefferson, St. Charles, and Crowder colleges due to missing/anomalous data. The x-axis scale is reduced so that values for the smaller institutions are visible. Approximate in-district (ID) subsidy is calculated by taking the difference in average net tuition revenue per student between ID and in-state students, then multiplying it by the number of ID students.
Source: Missouri Institutions (via MDHEWD) and Missouri State Auditor.

5. The legislature should direct the Department to propose a plan for implementation of a new funding model including timelines and staging (for example, the conditions for funding the basic adequacy component of the model before funds are distributed through the performance component).

6. The legislature should recognize that there will be some modest additional costs incurred to properly administer this new funding model and to provide the necessary support. While NCHEMS has supplied the Department with a tool that can generate results from the model, there will be a recurring need for funds to provide staffing sufficient to operate the model, collect additional data, maintain the accurate functioning of the formulas, communicate about the model with current and future policymakers and institutional leaders, and regularly convene institutional representatives to make necessary and appropriate modifications to it as conditions evolve. Currently, the Department lacks the full capacity needed to maintain the model and is especially lacking capacity in the short term as the state transitions to its use. NCHEMS estimates that the Department will need additional staffing support of about 1 FTE to manage the funding model, while its leadership team will need to prioritize the implementation of the funding model throughout the transitional period.

7. The legislature should direct the Coordinating Board and MDHEWD to ensure that role and scope designations are current. In doing so, the legislature should ensure that the Department goes beyond mission statements in favor of a more meaningful description of the programs that each institution should serve, the student populations it should be reaching, and any special mission characteristics. The Coordinating Board should be expected to keep these updated on a regular basis. Current statute already provides the necessary authority the Coordinating Board needs to perform this function.[21] However, its approach has been to designate "statewide missions" on a select group of program areas that serve to create preferred providers amongst the institutions in ways that exacerbate competition among them that fails to serve the needs of students. The review of missions should consider the programs and the intended audiences simultaneously, such that students in one corner of the state can get access to programs without forcing them to relocate. Doing so via collaboration among institutions is a better and more efficient solution than establishing quasi-monopolies.
8. The legislature should direct the Department to develop ideas for how Missouri might provide dedicated funding to seed and sustain productive collaborative efforts among its public institutions. One option is to use finance policy to overcome the barriers that limit partnerships among institutions that might pay dividends in greater overall efficiency and in the enhancement of services, especially to populations or regions of the state are particularly difficult to serve effectively. Another option is to invest state resources in entities that perform certain functions on behalf of multiple institutions (e.g., purchasing, operation of data systems, providing instructional design assistance).

<u>Recommendations to the Coordinating Board and the Department</u>

NCHEMS recommends that the Coordinating Board and the Department:

1. Develop the detailed specifications for a funding model designed in accordance with the general guidance provided by the General Assembly. This will involve selecting the set of parameters to be used and the values for those parameters. NCHEMS is recommending a detailed set of parameters and values but recognizes that the Department may have good and sufficient reasons for developing its own set of recommendations. This recommendation is not intended to suggest that a change is needed in the process by which the legislature appropriates funding to the community colleges. That is, although the new funding model will produce output to support recommendations for individual community colleges' appropriations, this recommendation should not be interpreted to call for a change in the current approach by which the Department and the Missouri Community College Association work together to allocate total funding appropriated to the community colleges as a group.

[21] 173.030(8) RSMo

2. Establish the performance funding component of the model based on a fixed per-point dollar amount to be recommended to the legislature each budgetary period. Once this value is set, institutions should be able to count on funding at or very near that per-point amount. How to account for a shortfall in total funding levels derived by the sum of the institutional adequacy and performance portions will be addressed in the implementation section below.
3. Prepare an implementation plan for submission to the legislature that incorporates the following features:
    a. The model should be implemented over a period of two to four years, specifically to guard against changes to institutional funding patterns that are destabilizing for the institutions by giving them a realistic opportunity to plan for how the model works. In the first year, institutions should be held harmless from reductions in their state allocations. Over the next 2-3 years, reductions may be appropriate—when calculations indicate that state funding levels (after cost shares are factored in) are in excess of the "adequate" amount, but a stop-loss provision should be implemented. For example, reductions in state funding should not exceed 1-2 percent in year two nor 2-5 percent in subsequent years, after which the model should be fully operational.
    b. Priority should be shared between meeting adequacy—and closing gaps in institutional funding equity (as determined by the model)—with consideration given to incentivizing performance improvements. In the early years of the model's implementation, the balance should favor ensuring adequate levels of funding with allocations based on performance growing as time passes and gaps in adequacy and equity are reduced.
    c. Attention should be given to ensuring that affordability for students is maintained. There should be a periodic assessment of affordability at each institution and student share of calculated adequacy funding be adjusted to reflect the findings. NCHEMS is making recommendations regarding shares to be borne by students in each type of institution—with institutions that serve students with greater economic means expected to have the students carry a relatively greater share of the burden and the state a lesser share.
    d. When funds are insufficient to meet full funding requirements as determined by the model, it would be appropriate to reduce state funding to institutions proportionately based on their corresponding share of total funding requirements (after consideration of cost-sharing targets), including both the variable cost and performance components, but excluding the frugal foundation. In other words, the state (together with local governments with respect to the community colleges) should retain full responsibility for funding the fixed-costs portion of the model, even when conditions require reductions in state funding to higher education.
4. The performance funding model should be funded based on a fixed per-point dollar amount. The legislature will set a per-point amount each budgetary period. But once set, institutions should be able to count on funding at or near that per-point amount. How to account a shortfall in total funding levels derived by the sum of the institutional adequacy and performance portions will be addressed in the implementation section below.

5. Establish policies that call for:
    a. Periodic review and revision of the funding model. NCHEMS suggests creation of an Advisory Group to provide guidance regarding:
        i. A technical review every year.
        ii. A policy review every five years.
    b. Bringing the Department's data gathering activities into line with the data requirements of the funding model. The objective should be that data needed to drive the funding model are collected annually as a regular part of the Department's normal data collection activities. Two areas where special attention is needed as the model transitions into full implementation are:
        i. Physical facilities and equipment costs—NCHEMS' modeling used available data from Missouri for the replacement costs of physical facilities on campuses and, in the absence of state-specific data on equipment, federal data about depreciation. Attention to ensuring that each of these data sources are more specific to the intent for asset maintenance and renewal, including consistently applied business definitions that focus costs on education and general use of both physical spaces and equipment, will improve the model's implementation.
        ii. Scale, scope, and audience—A Missouri-specific cost study to replicate the weights being used in the funding model demonstration would be a substantial and costly undertaking for the Department, the institutions, and the state. There is no credible reason to make such a special effort simply to gather Missouri-specific data to use in place of fundamentally similar data already collected in other states. However, the nature of the funding model necessitates focused attention by the Department on research and analyses that emerge in the field about the relative costs of programming by discipline and level and about the relative costs of increasing the academic success achieved by different student populations. Such topics should be a routine part of the technical working group's agenda. The Department should also seek out opportunities to connect the public institutions to national efforts to collect and use relevant data, such as the Delaware Cost Study and the National Community Colleges Benchmark projects.
        iii. Noncredit programming—Missouri's access to high-quality, comparable data on noncredit activity is uneven at best. In this regard, it is not much different from other states. But noncredit is a growing programming area for postsecondary institutions, especially community colleges. Noncredit programming includes customized training, personal interest courses, and workforce-oriented courses and programs that enable institutions to flexibly, creatively, and rapidly respond to changes in their local labor market. Data that focus on this latter type of noncredit activity and are comparable across

institutions are needed to ensure that the state can appropriately support such activity.

iv. Tuition revenue—A full picture of the revenue each institution receives from students, either from out-of-pocket payments or from Pell and state grants, is not available in Missouri. This is because IPEDS treats grant aid as expenses, which means that dollars institutions receive in the form of student grants that are used to offset tuition payments are not included in the net tuition revenue variable in IPEDS. Yet some of those grant dollars are used to pay for instructional costs. Nor does Missouri collect data for net tuition revenue that includes grants. Such a collection would help the Department and policymakers have a more complete understanding of the revenue available to Missouri's public institutions, including the degree to which institutions are reliant on grant aid funds that come from federal, state, and restricted institutional sources.

c. Develop role and scope designations for each of Missouri's public institutions and use them as the primary framework for program review and approval, as well as in helping the legislature direct investments in needed new capacity.
d. Develop a policy for the consideration by the legislature and the Coordinating Board that deliberately incentivizes collaboration among institutions in the sharing of administrative services and the delivery of academic programs. While such a policy might have several important aspects, an especially critical one is financial. The state cannot expect institutions to routinely take decisions that are financially risky or organizationally uncertain, and setting up partnerships with other institutions is fraught with potential barriers that may be overcome with financial incentives appropriately designed and implemented.
e. The Department has a special role to play in serving as a clearinghouse for information about campus initiatives aimed at improving efficiency—those that are successful as well as those that may have fallen short of their goals. The lessons learned from both cases can be equally valuable. In addition, the Department can convene institutions to scale smart strategies, to celebrate successes, and to help work through the adaptations necessary for ideas that are good in one place to flourish in another. This study provided the groundwork for the former—the clearinghouse of institutional activity. Future efforts should be made to keep track of the lessons to be drawn from institutional efforts both within Missouri and across the nation. With respect to effective collaborations, there should be no one-size-fits-all approach but rather the Department can facilitate regional efforts or efforts that break along lines related to subject matter or other natural distinction.