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HIGHER EDUCATION OUTCOMES-BASED FUNDING MODELS AND ACADEMIC QUALITY

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Introduction

State funding methods for public colleges and universities has varied over time, with many of the changes in approach reflective of evolving priorities and goals for higher education. Today, there is a mix of funding approaches used by states, again reflective of the particular circumstances within each state (Hearn, 2015). One popular method used by states to fund postsecondary institutions is by the number of semester credit hours of instruction that students enroll in. These enrollment-based models are generally viewed as fair, although flagship campuses with limited ability to grow are not always enamored. States expend considerable effort to develop and achieve buy-in from colleges and universities for such models, and many are calibrated with actual accounting data on historic delivery costs. However, because enrollment-based models tie funding solely to service volume, they provide little incentive for quality and may provide disincentives for timely student completion.

Recent years have seen rapid increases in both the need and demand for higher education, just as the economic downturn has placed increasing pressure on state higher education budgets. These trends and others have converged to inspire state policymakers, the coordinating and governing boards for higher education, and other stakeholders to consider ways to better align institutional priorities and activities with state goals, create incentives for quality, and more efficiently prioritize dwindling state resources for

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higher education. There is increasing interest in considering new outcomes-based funding¹ models for higher education that explicitly tie state funding to well-defined performance metrics. Several states are developing or implementing outcomes-based funding models.

Importantly, one criticism of the emerging outcomes-based funding models is that they tend to focus primarily upon productivity—specifically increasing the number of students who receive degrees and meet other academic milestones—without explicitly focusing on quality (Miao, 2012; Dougherty, 2012).

¹Outcomes-based funding models are an evolved form of “performance funding,” which refers to a broad set of policies linking allocation of resources to accomplishment of certain desired objectives. Historically, postsecondary performance funding models were often add-ons or bonuses to base institutional allocations that institutions earned for meeting various goals or benchmarks. Additionally, many of these earlier models included measures focused more on inputs or processes than student progression and outcomes and were not intended to drive increased student completion. Today’s outcomes-based funding models similarly seek to create incentives for and reward progress toward a set of stated goals, and have a direct link to the state’s higher education attainment needs and place primary emphasis on student completion, though they often include measures beyond student progression and completion. Advanced outcomes-based funding models also determine how a significant portion of the state’s general budget allocation to institutions is determined.

Indeed, there is much concern that efforts to align funding with student outcomes may lead institutions to shirk on quality. By and large, these are valid and important concerns, as few outcomes-based funding models have been designed in ways that more directly address issues of quality.

Meanwhile, just as outcomes-based funding models have gained popularity across states, the research community has turned towards the challenging task of defining and measuring college quality. The hope is that rigorously defined quality metrics can be used to monitor quality as states implement outcomes-based funding models to ensure that efforts to improve student progression and completion do not come at the expense of quality. Eventually, if stakeholders can agree upon a set of quality metrics, they may be explicitly incorporated into outcomes-based funding models so that those models create incentives for both student progression and completion and quality.

Unfortunately, we are a long way away from having a set of rigorous quality metrics that institutions and other stakeholders can agree upon. Defining and measuring college quality is a contentious issue, and the debate about how to do so is far from settled. What is quality when institutions produce outputs ranging from student learning and labor-market success to research? How do you measure student learning when students specialize in a major field? How do you tie quality metrics to funding in a way that recognizes the diverse missions of institutions?

While these questions remain unanswered, states continue to move forward with outcomes-based funding models. Policymakers need useful information to guide these important decisions. Unfortunately, existing evidence comes from a myriad of disconnected and undigested sources such as:

- 1) Academic and policy literature defining college quality;
- 2) Experience with and assessments of a wide range of metrics designed to measure components of college quality;
- 3) States that have developed and implemented an outcomes-based funding model.

This paper distills these existing sources into the most important lessons for policymakers considering outcomes-based funding models and wanting to ensure that those models improve student progression and completion while also maintaining or enhancing quality. We begin by discussing the concept of quality in higher education, paying particular attention to the multiple and often differentiated objectives of colleges and universities, as well as possible indicators of quality factors that could be measured in different ways. In doing so, we are careful to make a clear distinction between quality on the one hand and productivity on the other. Next, we describe criteria by which to evaluate quality metrics. We then describe quality metrics that researchers and policymakers have used or proposed, and we evaluate those metrics by the criteria we describe. We also describe the outcomes-based funding models that states have used for tying funding to outcomes, and offer insights about how current and future quality metrics might be incorporated into those models or used to ensure outcomes-based funding models do not lead to reduced quality. We close with overarching recommendations based on the existing evidence.

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Important Considerations for Defining Quality in Higher Education

Measuring college quality presupposes a rigorous and well-defined notion of quality in higher education. Unfortunately, the research and policy community is far from consensus on this. Below are several of the greatest challenges to developing a rigorous notion of quality in higher education.

Colleges and universities draw upon a range of inputs and processes to produce a diverse array of important outputs and outcomes. Colleges and universities are complex institutions that endeavor to produce many different outputs and achieve a number of different goals. They seek to promote:

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- 1) **Student success.** First and foremost, colleges and universities endeavor to improve the outcomes and life experiences of their students. Students draw on the knowledge and skills they gain in college to excel in their careers and be knowledgeable, engaged and productive members of society.
- 2) **Student access and diversity.** Colleges and universities seek to provide opportunities to non-traditional students, including minority, economically disadvantaged and adult students. Colleges and universities increasingly recognize the value that diverse students bring to campus life. If national goals for attainment are to be met, policymakers and higher education leaders increasingly must place a priority on eliminating inequitable educational outcomes among racial and ethnic minorities and other underserved students.
- 3) **Meeting workforce needs.** Colleges and universities seek to connect their students to employers who can benefit from their knowledge and skills. Many colleges and universities work with large employers and other stakeholders to develop programs specifically tailored to employer needs. Others equip students with general skills for use in a broad array of careers.
- 4) **Research and innovation.** Many colleges and universities produce scholarly and applied research that benefits the academic community and society.

Colleges and universities have differing missions. Colleges and universities have wide-ranging missions with differing emphases on different outputs and outcomes. Institutions also vary considerably in the processes they employ to achieve their missions. For example, one institution may generate millions of dollars of externally funded research, while another may produce no research at all. Similarly, a community college may develop degree programs specifically targeted at meeting local workforce needs, while a liberal arts college focuses on equipping its students with general knowledge and skills. Nevertheless, each institution may perform equally well when measured by its mission and goals.

Colleges and universities have different students and resources. Colleges and universities vary greatly in the students they serve and the resources they have to produce the outputs they prioritize. State flagship universities, for example, tend to have students with more pre-existing knowledge and skills as well as a larger endowment that can be used to hire high-quality faculty and develop programs that contribute to the success of their students (Cunha and Miller 2014; Hoekstra

2009). It is thus no surprise that earnings and other outcomes of graduates of flagships are better on average than those of students attending regional bachelor's-degree-granting institutions. A portion of the resulting difference in outcomes between these institutions is attributable to the types of students attending them and the resources available to them (Cunha and Miller 2014; Hoekstra 2009; Schneider 2014).

Institution priorities often differ from the state's

objectives. An institution's mission and goals may conflict with the best interests of the higher education system or with the goals of policymakers. For example, a regional PhD-granting institution may desire to expand its mission and greatly increase its research production. Similarly, a community college may desire to offer bachelor's degrees in applied fields. While both may be worthy objectives for an ambitious institution, such goals may compete with those of other institutions that are already addressing these needs. A key goal for outcomes-based funding models should be to promote alignment between the state's objectives and those of institutions.

Quality must be clearly distinguished from productivity and efficiency. Productivity and efficiency are worthy goals of states and institutions. However, critics of outcomes-based funding models have argued that focusing on productivity and efficiency could cause institutions to reduce the quality of education they offer. The goal of this paper is to address this criticism, so any quality metric must focus on institutional performance relative to other goals. We describe some key goals and metrics below.

Criteria for Quality Metrics

A good metric of quality should:

Flow directly from the needs and goals of students, the state, or the mission and goals of an institution, or a higher-education system. As noted above, institution missions may include promoting student success, promoting student access and diversity, meeting workforce needs, and research. To a large extent, student and state needs and goals overlap with these primary focus areas, but the relative weight each group places on those areas can differ considerably across groups. For example, research institutions tend to place more weight on research than students or the state, particularly given the federal role in funding research in the United States. While, in general, a quality metric should be informed by the needs and goals of other stakeholders, a key goal of outcomes-based funding is to better align the incentives of institutions with those of the state. We thus focus on quality metrics that can help achieve this goal.

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Be focused on achieving outputs or outcomes. A good quality metric should focus on producing outputs and outcomes. Input and process metrics are also relevant when they can be shown to produce desired outputs and outcomes. Many of the most popular college ranking systems, such as that by *U.S. News & World Report*, use inputs such as student-faculty ratios and selectivity that are not clearly linked to important outputs and outcomes. These rankings reward institutions for the students they serve, rather than the value they add.

Adjust outcomes and outputs for inputs. A good quality metric should adjust outcomes and outputs for the inputs that colleges and universities have to produce them. For example, a fair comparison of student earnings should account for differences in the characteristics of students (i.e., academic preparation at time of entry) as well as other pre-existing resources across institutions.

Be straightforward and understandable. Institutions and policymakers must have a clear understanding of the metrics to which they are held accountable and of the particular way in which they contribute to funding. This allows them to institute effective policies to improve their performance. Complex statistical methods to adjust outcomes and outputs for inputs may be attractive for precision but difficult for colleges, universities, and policymakers to understand.

Be practical and cost-effective to implement. Wherever possible, the metric should minimize the need for additional data collection by drawing on existing data resources such as state administrative data systems and federal data such as the Integrated Postsecondary Education Data System (IPEDS).

Provide short- to medium-term feedback. In order to induce meaningful change, a quality metric should provide short- to medium-term feedback to colleges and universities so that they can receive a positive and timely return on investments in processes and activities intended to improve their performance on the metric.

Be difficult to game. Experience in other sectors suggests that policies that create incentives for performance on a set of metrics may elicit unintended responses by institutions interested in artificially increasing their performance on those metrics. For example, in the K-12 context, there is evidence of increased suspensions of students likely to perform poorly on state assessments on days when tests are administered (Cullen and Reback, 2006).

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There can be tension between some of the criteria listed above. Some metrics may do well on some criteria and poorly on others. For example, while all colleges and universities presumably endeavor to improve earnings outcomes of their graduates, it takes five to six years post-enrollment to observe earnings for a meaningful share of an entering cohort of students. Thus, while the input-adjusted earnings of graduates metric does well on many of the criteria listed above, it may be limited in utility, as it does not provide meaningful short-term feedback to colleges and universities.

Additional Criteria for Embedding Quality Metrics into Outcomes-Based Funding Models

An outcomes-based funding model requires both a set of good quality metrics and a funding methodology that encourages, rather than discourages, quality. A good outcomes-based funding model should:

Promote alignment between state priorities and the mission and goals of institutions. As noted above, institutions often have competing interests with students and the state. An overarching goal of outcomes-based funding models should be to use state funding to make institutions more accountable to the mission and goals of students and the state. As such, the quality metrics embedded in the outcomes-based funding model should be oriented toward the state's perspective.

Include an appropriate mix of input, process, and outcome metrics. Specifically:

Place significant weight upon appropriate output and outcome metrics. Outcomes-based funding models should hold institutions accountable for achieving results and pursuing activities aligned with state goals, and hence should place significant weight upon output and outcome metrics. As noted above, outcomes and outputs should account for differences in student characteristics and other relevant inputs, so as to make fair comparisons across institutions.

Include input metrics to create incentives for success with underserved students. In some cases, the state may also wish to provide incentives for institutions to effectively serve certain groups of students, such as racial and ethnic minorities, Pell Grant-eligible and / or adult students. In such cases, outcomes-based funding models may include input metrics, such as the number of full-time-equivalent students from each of these groups. Another approach used by several states currently implementing outcomes-based funding models is to put a premium (or extra "weight") for successfully serving underrepresented students.

Aim for process metrics that create incentives for research-based activities that lead to important outputs and outcomes. Finally, while the ultimate goal of outcomes-based funding models should be to improve institution outcomes, these institutions may not know what activities to engage in to improve their performance on specific outcome and output metrics. Wherever possible, outcomes-based funding models can include significant weight upon process metrics that have been shown to improve performance on relevant outcome and output metrics. Indeed, current accountability systems in healthcare and, increasingly, in K-12 education include significant weight upon process metrics that have been shown to improve relevant outcomes (Williams et. al., 2005). Unfortunately, the research base in higher education currently lacks sufficient evidence to warrant inclusion of many process metrics, but over time, as research emerges, more weight can be placed upon relevant process metrics.

Account for differences in missions of colleges and universities. A successful outcomes-based funding model should recognize the varying missions of colleges and universities and encourage appropriate differentiation that leads to system-wide success.

Ensure that outcomes-based funding is sufficient to gain attention but not too large to create instability. To ensure that institutions have sufficient incentives to develop and implement effective policies to support improvement, the outcomes-based funding system must have adequate funding. At the same time, the funding tied to outcomes should be sufficiently stable to ensure that institutions can adequately forecast funding streams and plan effectively. To support effective change, studies recommend levels of outcomes-based funding ranging from 5 percent to 25 percent of overall state higher education funding (Miao, 2013; HCM Strategists, 2013; Complete College America, 2012; Dougherty, Natow and Vega, 2010; National Conference of State Legislatures, 2012).

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Achieve buy-in of colleges and universities and other stakeholders. A successful outcomes-based funding model must have the buy-in and support of all stakeholders to be successful and sustainable. Successful implementation requires close collaboration at all stages of design and implementation among the state government and institution administration and faculty (Kadlec and Shelton, 2015).

Evaluating Current Metrics

Researchers and policymakers have developed an array of metrics to measure contributors to college quality. Some of these metrics have been tied to state higher education funding. Below we describe the advantages and disadvantages of some of the most common college quality metrics in light of the criteria developed above. Given that a primary goal of outcomes-based funding models is to hold public institutions accountable for meeting state goals, we focus upon metrics that are focused on the state perspective. In particular, while research is an important activity of many colleges and universities, we do not focus on research metrics, given that the federal government plays the largest role in the research activities of colleges and universities. Instead, we focus upon student success, access and diversity, and meeting state and local workforce needs, as these are all areas that are closely aligned with state priorities.

Student Success

Student success metrics measure an institution's direct contribution to the outcomes and life experiences of students and alumni. These are direct measures of student outcomes, and measures of student learning engagement and satisfaction.

Direct measures of student learning are attractive in theory and can be adjusted for student characteristics. In the short term, they show promise as a tool to monitor quality as states implement outcomes-based funding models. Student learning is a primary output of institutions,

which students draw upon to develop their careers and become active and engaged members of society. Student learning is particularly important as critics of outcomes-based funding have argued that efforts to improve productivity will lead to watered down instruction and reduced learning. Despite the importance of student learning, developing a set of practical metrics that accurately and fairly measure student learning while also balancing the criteria for good college-quality metrics for outcomes-based funding is extremely challenging. In practice, only Missouri has successfully implemented funding model that includes direct measures of student learning (National Governors Association, 2013).² Nevertheless, these metrics show promise as a tool to monitor quality as states implement outcomes-based funding models.

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Measuring student learning in higher education is particularly complicated for two reasons. First, students customize their education by choosing a college major and the particular courses that lead to a credential or degree. Thus, the knowledge and skills that colleges and universities intend to impart on their students varies across students. Within the field of higher education, efforts such as the Degree Qualifications Profile have attempted to suggest common learning outcomes across such dimensions as the acquisition and application of: specialized knowledge, broad and integrative knowledge, intellectual skills, individual and collaborative learning, and civic and global learning.

Second, colleges and universities develop two types of knowledge and skills: specific knowledge and skills, such as when a computer science major learns how to program in C++; and general knowledge and skills, such as the problem-solving skills developed across the entire curriculum. College majors vary in their degree of emphasis on general and specific skills, with engineering and nursing degrees weighted toward specific knowledge and liberal arts degrees weighted towards general knowledge.

There are a number of assessments to measure general and specific skills, and many of these are well-validated.³ Many of these tests are vertically scaled, allowing for the computation of value-added scores that help address differences in student characteristics across colleges and universities. Yet there are several reasons why direct assessment of student learning is unlikely to see wide use in outcomes-based funding models in the near future:

- 1) It is difficult to interpret and apply these measures in a fair and transparent way that can achieve the buy-in of all colleges and universities. For example, how should we compare gains in general skills among engineering students to similar gains among English majors?
- 2) Colleges and universities vary considerably in the extent to which the content covered in their degree plans aligns with the content covered in existing assessments. Given colleges

²The Missouri funding model includes an indicator for scores on one of three types of assessments: general education assessments, major-specific assessments or licensure exams. Institutions must choose one type of assessment to include in their formula funding model (Coordinating Board for Higher Education).

³These include the Collegiate Learning Assessment (CLA), ACT's Collegiate Assessment of Academic Proficiency (CAAP), and ETS's Measure of Academic Proficiency and Progress (MAPP). There are also existing assessments for specific skills in some but not all college majors. These include ETS's Major Specific Tests, the GRE subject tests, and licensure exams.

and universities' strong opposition to policies mandating curricula, it is likely to be difficult to achieve buy-in for a particular assessment.

- 3) Institutions and other stakeholders have expressed concerns that directly creating incentives for performance on particular assessments will lead institutions to tailor their content towards the assessment and "teach to the test." Indeed, there is evidence that teachers in K-12 schools have shifted their focus toward content covered in state tests (Reback, 2008).
- 4) Wide implementation of assessments could be extremely costly, both in terms of test development and administration.⁴

One specific type of student learning metric that has received significant attention is student performance on required certification and/or licensure exams, such as the NCLEX for nursing and the Fundamentals of Engineering, Professional Engineer and Structural Engineer exams for engineering majors. These exams provide a useful and systematic source of data on the knowledge and skills of graduates in specific fields that require licensure. Because all graduates in fields that require licensure must pass these assessments in order to obtain relevant jobs within their fields, institutions place great emphasis on aligning curricula with the content covered in the assessments. Generally, there is broad consensus that the content covered in the assessments represents what reasonable graduates should know, so there is little concern over "teaching to the test." Where student characteristic data are available at the program level, licensure test scores can be adjusted for student characteristics. When they can be adjusted for program-level entrance exams scores, they are similar to value-added metrics. The key limitation of these metrics is that they are only available at the program level, and only for programs that require licensure.

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Despite the challenges noted above, student-learning metrics deserve continued research. Because critics of outcomes-based funding have argued that increased attainment could come at the expense of student learning, it is important to consider how student learning can be measured, monitored and given incentives within the context of outcomes-based funding. Given the degree of alignment between program curricula and assessment content, student scores and pass rates on licensure exams show promise for direct inclusion within outcomes-based funding models. Broader student learning metrics could also be attractive as a monitoring tool for states that are implementing outcomes-based

⁴However, the movement of colleges and universities toward competency-based learning as a way to plan, organize, deliver, and support education, which often uses analytics software to track the acquisition and demonstration of discrete competencies, offers significant potential in this area.

funding. For example, states could administer common assessments like the Collegiate Learning Assessment, Collegiate Assessment of Academic Proficiency, Measure of Academic Progress and Proficiency, or ETS Proficiency Profile subject tests to a random set of students from institutions across the state annually. If assessment scores decline as outcomes-based funding is implemented, this could be sign that institutions are shirking on quality and should redouble their efforts to maintain or improve quality.

Direct measures of student outcomes are practical and cost effective to implement, but they should account for student characteristics and other available resources. Ultimately, colleges and universities endeavor to improve the life outcomes of their students. Data on student outcomes such as persistence, degree completion, and earnings are widely collected and readily available in different formats, making the calculation of student-outcome metrics relatively practical and cost-effective. Most of these metrics can also be adjusted for student characteristics. Nearly all outcomes-based funding models include student outcomes metrics, but only a handful of states directly adjust them for student inputs. However, many states adjust student outcomes metrics indirectly by placing greater weight on outcomes achieved by “at-risk” students, particularly those who are racial and ethnic minorities and/or from low-income families. States should work towards implementing outcomes-based funding models that include student outcomes and adjust them for student inputs either explicitly or implicitly.

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Student outcomes metrics fall into two broad categories.

- 1) **Input-adjusted measures of progression.** Degree- or credential-seeking students enter college intending to complete their course of study. These metrics aim to capture an institution's ability to support students in meeting their academic goals. Common indicators include measures of persistence towards degree, credit accrual, successful transfers, meeting key milestones, credential completion, and acceptance rates at graduate programs. These metrics have short- to medium-term time lags.
- 2) **Input-adjusted measures of labor-market success.** Most students enter college to gain knowledge and skills to apply in the job market and meet their career goals. These metrics aim to capture an institution's ability to support students toward meeting their career goals. Common indicators include measures of job placement, earnings, and student loan default rates. These metrics have long time lags, which may limit their attractiveness as a policy-making tool.

Researchers have developed a range of methods to directly adjust student outcomes metrics for student characteristics. One approach uses regression models to adjust for multiple student characteristics simultaneously. The goal of these methods is to control for any observable student

characteristic that might also be related to student outcomes, so as to make comparisons as fair as possible. Unfortunately, such methods conflict with the need for metrics to be simple and understandable. Hence, they have been difficult for policymakers to implement in practice.

An alternative and simpler approach that adjusts for some but not all student characteristics is to produce a set of outcome metrics for students with different characteristics, such as those groups defined by Pell Grant eligibility or high school grades. Policymakers have had more success in implementing metrics such as these that balance the need to account for student characteristics with the need to be simple and understandable.

One criticism of approaches that directly adjust student outcomes metrics for student characteristics is that they effectively set lower expectations for “at-risk” students that have historically low success rates. An alternative approach is to adjust for student characteristics indirectly, by applying greater weights for outcomes achieved by at-risk students. This approach has achieved wider stakeholder buy-in because it rewards institutions for success with at-risk students, as opposed to applying a “lower bar.” This approach is also straightforward and relatively simple to implement. For these reasons, it has been incorporated into the outcomes-based funding models developed and implemented. These measures are important for encouraging colleges and universities to adopt interventions aimed at improving outcomes for racial and ethnic minorities and other at-risk students.

Student outcomes metrics vary considerably in the extent to which colleges and universities could game them. For example, colleges and universities could increase their completion rates by raising admissions standards or reducing the rigor or grading standards of their courses. Adjusting graduate numbers for student characteristics may limit potential gains from raising admissions standards, but does little to change incentives to reduce rigor or grading standards. Similarly, colleges and universities could increase earnings metrics by raising admission standards or shifting towards programs that offer higher earnings for graduates. Again, adjusting earnings for student characteristics may limit potential gains from raising admissions standards. Policymakers could also limit the incentive to shift towards programs that offer higher earnings by controlling explicitly for student major or computing earnings metrics by college major or broad field.

Measures of student engagement and satisfaction are related to student learning and experiences but more appropriate for internal use by colleges and universities. Colleges and universities also seek to provide positive academic and life experiences for their students. Validated student survey instruments, such as the National Survey of Student Engagement (NSSE), capture factors related to student engagement. Many colleges and universities participate in the NSSE and use detailed reports provided to them to improve student experiences in and engagement with their academic programs. While these data indicate student engagement and academic experiences, the NSSE can be impractical and costly to implement, and the data are not publicly available. It is also difficult to achieve stakeholder buy-in for these metrics, as they address process issues that most colleges and universities prefer to control.

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Student Access and Diversity

Student access and diversity metrics attempt to measure an institution's success at attracting and serving diverse students and providing access to non-traditional students including minorities and adult learners. This class of metrics is unique in that they measure inputs and processes rather than outputs and outcomes. Nevertheless, access and diversity is often a goal in and of itself, both for colleges and universities and the state. Common metrics include the percentage of students receiving or eligible to receive Pell Grants, the percentages who are racial or ethnic minorities, or the percentage who are adult learners. These metrics are simple, cost-effective to implement, provide short-term feedback to colleges and universities, and are difficult to game.

Meeting Workforce Needs

Colleges and universities are increasingly called upon by local and state leaders to address workforce needs. Indicators of meeting workforce needs can be considered process metrics, as they support a key mission of colleges and universities and a state goal to improve student labor-market outcomes. The primary metric here has been number of degrees or credentials produced in "high-demand" fields. States vary considerably in how they define "high-demand" fields, with some employing complicated statistical methods, and some drawing on discussions with employers and other stakeholders. Most of these approaches are relatively new, and there is little research evaluating the relative merits of particular approaches.

Whatever approach a state employs to arrive at a set of high-demand fields, it should achieve stakeholder buy-in and:

1) **Institute a process to regularly update the set of priority fields.**

The process should balance the need to give colleges and universities sufficient time to expand production in high-needs fields with the need for those fields to represent true workforce needs.

2) **Reward increased production rather than current production.** Rewarding current production in high-needs fields would only increase funding for colleges and universities that already have high production in those fields rather than spur any colleges and universities to increase production in them.

While meeting workforce needs is a laudable goal for colleges and universities, and one that states generally want to encourage, existing metrics are lacking in many ways. They are expensive to implement and it is unclear whether they accurately identify workforce needs. Further work is needed to design methods for identifying workforce needs.

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Ensuring Quality

While the primary focus of outcomes-based funding models has been upon improving student progression and completion, there are several ways in which these models have implicitly or explicitly addressed quality:

Many past and current outcomes-based models are designed so as to implicitly include input-adjusted graduates. The primary focus of most current outcomes-based funding models has been overwhelmingly to shift towards funding institutions on indicators of total degrees granted as opposed to enrollment. However, in most cases, states have weighted degrees awarded to at-risk students (such as Pell Grant-eligible students, adult learners or minority students) more heavily. In such cases, the model does account for student characteristics, and the net result is similar to funding based on input-adjusted graduates, which is a quality metric.

In most cases, states have weighted degrees awarded to at-risk students (such as Pell Grant-eligible students, adult learners or minority students) more heavily. In such cases, the model does account for student characteristics, and the net result is similar to funding based on input-adjusted graduates, which is a quality metric.

Many past and current outcomes-based funding models attempt to reward institutions for meeting workforce needs. As described above, states typically do this by placing more weight upon graduates in fields deemed as high-priority by the state. As described above, meeting workforce needs can be considered a process metric designed to improve labor-market outcomes for students and to ensure the institution is responsive to state and local needs. However, current approaches to identifying workforce need leave a lot to be desired, so it is unclear whether current efforts will achieve their well-intentioned effects.

Past and current outcomes-based funding models often do include access and diversity metrics. As described above, outcomes-based funding models often place greater weight upon degrees awarded to at-risk students. This is a direct way to reward institutions for promoting access and diversity.

A handful of states have successfully implemented outcomes-based funding models that include more explicit quality metrics. Missouri's outcomes-based funding model includes performance on general and major-specific assessments (National Governors Association, 2013). Nevada and Tennessee both include student job placement as a metric within their outcomes-based funding model (National Governors Association, 2013). The Texas State Technical College System recently shifted to a funding model that is based entirely on the earnings of its graduates.

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While past and present outcomes-based funding models have implicitly or explicitly addressed quality in the ways described above, they can and should go further to ensure that efforts to improve productivity enhance rather than undermine quality. Specifically, states should consider including value-added metrics of student labor-market outcomes, as well as measures of student learning and engagement. More work should be done to help states identify statewide and local workforce needs so that effective process metrics can be designed to reward institutions for addressing those needs. States can use student learning metrics to monitor quality as they implement outcomes-based funding models. Finally, research should identify additional processes that improve student labor-market outcomes, learning and engagement. Over time, as a research base emerges and effective processes are identified, outcomes-based funding models can include weight upon process indicators that are linked directly to desired outcomes.

Conclusion and Recommendations

To better align institutional priorities and activities with state goals and to more efficiently prioritize dwindling state resources for higher education, states are increasingly seeking to implement outcomes-based funding models that explicitly tie institution funding to a set of performance metrics. Policymakers need sound information to make these decisions. While current research on these issues is only just emerging, several key themes are evident.

States should consider ways to draw upon and shape the emerging research agenda on measuring quality in higher education so as to ensure that outcomes-based funding models enhance quality while also improving student progression and completion.

Existing quality metrics vary considerably in the level and quality of research and testing that has supported their development and refinement. Given the current state of research and implementation, states must develop a pragmatic approach to incorporating emerging quality metrics into funding models. Policymakers and researchers should work together to guide the development, implementation, and evaluation of a set of metrics that accurately measure the constructs that states would like to encourage. Given the state of research and implementation, we recommend that:

States should consider using student grades and learning metrics to monitor quality as they implement outcomes-based funding models. Critics of outcomes-based funding argue that increased productivity will be accompanied by watered-down curricula and reduced student

Over time, as a research base emerges and effective processes are identified, outcomes-based funding models can include weight upon process indicators that are linked directly to desired outcomes.

Policymakers and researchers should work together to guide the development, implementation, and evaluation of a set of metrics that accurately measure the constructs that states would like to encourage.

learning. While it is challenging to obtain buy-in to include student assessments directly into outcomes-based funding models, a program of low-stakes assessments that are used to monitor quality as outcomes-based funding is implemented may be more acceptable. If student learning declines as states implement outcomes-based funding, then further steps can be taken to ensure quality. As an additional check, states may consider monitoring student grades for evidence of grade inflation as they implement outcomes-based funding models. If grades increase without a concomitant increase in student assessment scores, then this may be taken as a sign of increased grade inflation that would trigger increased focus on quality.

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States should begin to incorporate appropriately researched quality metrics into funding models.

The most promising college quality metrics for current use in outcomes-based funding models are *input-adjusted measures of student outcomes and student access and diversity*. These metrics are straightforward and understandable, draw from existing data sources, and are acceptable to stakeholders. Adjusting student outcomes for student characteristics can help make fairer comparisons across colleges and universities with different types of students.

Licensure tests are attractive sources of data for measuring student learning at the program level. These tests provide a uniform measure of the knowledge and skills of graduates of the programs that require licensure tests that all students must achieve to enter the profession. By adjusting student-level scores for entrance-exam scores, states can develop value-added measures of student learning in particular programs.

Undertake a program of research to develop, implement and evaluate appropriate methods for identifying workforce needs. Meeting workforce needs is a laudable goal of colleges and universities and one for which state governments would like to create incentives. However, current methods are limited in their ability to pinpoint workforce needs. Further research is needed to help states develop appropriate metrics for rewarding colleges and universities that meet these needs.

Aim towards including process metrics. Process metrics are attractive, but more research is needed to identify processes that produce desired outcomes. Process metrics have proven useful in other government sectors like healthcare and K-12 education. Institutions may want to improve performance along a set of output or outcome metrics, but may not know what processes can help them to do so. By directly including process metrics in the outcomes-based funding model or developing additional incentive structures that directly fund such processes, the state can help institutions implement effective processes that are aligned with state goals. The research base on the impact of different institution processes on relevant outcomes is quite limited, but is rapidly emerging.

Wherever possible, student outcomes and diversity metrics for outcomes-based funding models should draw upon existing data. State administrative data are a powerful and cost effective resource for developing student outcomes and diversity metrics. These data are available in most states and allow researchers to adjust student outcomes for student characteristics. Attractive federal data sources include the Integrated Postsecondary Education Data System (IPEDS) and the National Postsecondary Student Aid Survey (NPSAS).

Balance the need to adjust student outcomes for student characteristics with the need to be straightforward and understandable. Student outcomes metrics should account for colleges and universities serving different populations by adjusting outcomes for student characteristics. Regression-based methodologies that are popular with researchers can be overly complex for a funding formula, making outcomes less transparent and difficult to communicate to a broad set of stakeholders. A simpler metric based on conditional means for outcomes of students with particular characteristics can address the need to adjust for student characteristics while also remaining understandable. Another simpler approach that has seen wider implementation is to place greater weight upon outcomes achieved for at-risk students.

Stakeholder buy-in is key. Experience with outcomes-based funding models has shown that it is imperative to involve stakeholders in the model development process. Stakeholders should agree on a set of metrics that represent their collective goals for higher education and a method for tying those metrics to state funding. To support the engagement process, states should highlight ways in which current outcomes-based funding models directly or indirectly provide incentives for quality. Future approaches should more explicitly incorporate direct quality metrics in the funding model, and employ student learning metrics to monitor quality as new funding models are implemented.

Stakeholders should agree on a set of metrics that represent their collective goals for higher education and a method for tying those metrics to state funding. To support the engagement process, states should highlight ways in which current outcomes-based funding models directly or indirectly provide incentives for quality.

Author Bio

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Trey Miller is a Full Economist at the RAND Corporation, who works with postsecondary policy-makers and practitioners to develop, implement, evaluate, and improve policies and practices to improve student access and success in postsecondary education while also reducing the cost of postsecondary education to students and taxpayers. Dr. Miller has lead and co-lead quantitative and mixed methods research projects with multi-disciplinary research teams and a combined budget of over \$9.9M for clients including the Institute of Education Sciences, the Lumina Foundation, the Bill and Melinda Gates Foundation, the Houston Endowment, the Spencer Foundation, and the US Department of Defense. Dr. Miller earned his PhD in Economics at Stanford University in 2010.

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