**A Typology and Landscape of State Funding Formulas for Public Colleges and Universities
from 2004 to 2021**

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Abstract

State funding for public higher education institutions is crucial in supporting college access and
completion, particularly among students from historically underrepresented groups, yet little is
known about the mechanisms states use to allocate funds and how they are affected by financial
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funding models that include a combination of base-adjusted and enrollment and performance
metrics, along with a growing focus on equity. During recessions, states frequently revert to
across-the-board funding cuts, further disadvantaging underresourced institutions.

Keywords: educational policy; finance; higher education; postsecondary education; community
colleges; equity; typology

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State funding for public higher education institutions is crucial in supporting college access and completion, particularly among students from historically underrepresented groups, yet little is known about the mechanisms states use to allocate funds and how they are affected by financial challenges. This paper provides the first detailed longitudinal typology of state funding strategies, focusing particularly on formula volatility and equity. We find a gradual shift toward funding models that include a combination of base-adjusted and enrollment and performance metrics, along with a growing focus on equity. During recessions, states frequently revert to across-the-board funding cuts, further disadvantaging underresourced institutions.

Keywords: educational policy; finance; higher education; postsecondary education; community colleges; equity; typology

Prior to recent enrollment declines since the start of the COVID-19 pandemic (National Student Clearinghouse, 2021), higher education experienced a 25% growth in enrollment over the past two decades. With public higher education institutions enrolling nearly three in four students in American higher education (de Brey et al., 2021), this sector plays a large role in absorbing that growth. Research shows positive relationships between state public higher education funding and student outcomes (Bound et al., 2019; Chakrabarti et al., 2020; Deming & Walters, 2017; Monarrez et al., 2021). However, per-student funding has declined over time and was only partially protected during the pandemic by a large influx in federal support (Laderman & Kunkle, 2022; Laderman & Tandberg, 2021). These decreases in higher education funding have direct negative consequences for long standing attainment gaps by race, family income, and parental education.

Ninety percent of all state support for public higher education is through direct appropriations to institutions (Laderman & Kunkle, 2022). While trends in state appropriations have been well documented over time, we know relatively little about the mechanisms states use to allocate funds to public colleges and universities. The choices states make in allocating funding for public colleges and universities matter because it helps determine which colleges and students benefit the most from public funding. Prior research provides snapshots of state funding mechanisms but focuses on one year or sector (e.g., Layzell, 2007; Mullin & Honeyman, 2007; Syverson et al., 2020; Toutkoushian & Shafiq, 2010).

To our knowledge, there has not been a systematic longitudinal analysis of state funding mechanisms. Given the lack of comprehensive longitudinal information about how states fund public higher education, state policy actors and institutional leaders do not have critical information about which institutions and which students stand to benefit under various funding

approaches. A large body of literature focuses on performance-based funding (PBF), which disproportionately benefits more-resourced institutions (Hagood, 2019; Ortagus et al., 2022) while restricting access to selective universities for underserved students (Ortagus et al., 2020). Still, PBF comprises less than 10% of all state funding for public higher education (Rosinger et al., 2022). Aside from PBF, there is little systematic documentation of how states fund public colleges or how elements of state higher education funding formulas, such as equity components, have evolved.

Additionally, while research has documented how higher education has traditionally acted as a balance wheel for state budgets by taking disproportionate cuts during recessions (Delaney & Doyle, 2011; 2018) and some research has examined institutional responses to state funding cuts (Delaney, 2023), little is known about how states change their funding approaches during recessions. Research has found that states frequently abandoned PBF systems during the early 2000s recession and the Great Recession (Dougherty et al., 2012; Rosinger et al., 2022), but these studies did not examine the funding mechanisms that were used to replace PBF or whether other funding approaches were also abandoned.

This article offers the first full descriptive picture of how states and higher education systems have allocated funding to public institutions over time, covering a period before the Great Recession through the beginning of COVID-19. We began by creating the first longitudinal typology of state higher education funding mechanisms based on the extent to which colleges can potentially influence their funding levels through their actions. Higher education institutions cannot influence funding if it is completely tied to last year's funding, but they can have some influence if funding is tied to enrollment or performance metrics. To create our typology, we drew on a comprehensive longitudinal dataset compiled from a review of nearly

3,500 state policy documents and direct correspondence with state higher education agency officials. We then considered the extent to which funding formulas' changes were associated with changes in funding or equity metrics.

Our research questions are the following:

1. What are the mechanisms that states and systems use to allocate funds to public two-year and four-year colleges and universities?

2. To what extent does volatility in funding formulas relate to volatility in state appropriations?

3. To what extent does the use of equity metrics vary when funding formulas or state appropriations change?

Literature Review

This section begins with a broad overview of funding for public higher education, including federal, state, local, and student dollars. We then turn our focus to state funding, particularly highlighting research linking state funding to student outcomes and the state-level economic and political factors that influence state funding. We finally discuss the literature on state higher education funding models and provide a conceptual framework for why different funding models may generate different institutional responses and which colleges and students benefit the most under various funding approaches.

Funding Sources for Public Higher Education

Public support of higher education is primarily from a combination of federal, state and local, and student dollars. In Fiscal Year 2019, public colleges received an estimated $419 billion in revenue (Kelchen et al., 2021). The majority of federal funds to support general operations in higher education come from the federal Title IV financial aid programs. In the 2020-21 award

year, students attending public institutions received $56 billion in Pell Grants and federal loans (authors' calculations using Federal Student Aid data). Students use a portion of those funds to pay for off-campus housing and other parts of the cost of attendance, but many of the funds stay with colleges to pay for tuition and on-campus housing charges. Approximately 27% of institutional budgets came from net tuition revenue and auxiliary enterprises in 2019 (Kelchen et al., 2021). Still, the figure is difficult to break down because one cannot determine whether the payments are from grants and loans or out of the students' pockets. The federal government also provides approximately $255 million in annual funding directly to minority-serving institutions to help support general operations and about $45 billion to support research at universities (Gibbons, 2021; Schwartz, 2019).

State funding comprised about 22% of institutional budgets (Kelchen et al., 2021) and reached $102 billion in 2021 (Laderman & Kunkle, 2022). The money states distribute to public institutions typically takes three forms. The primary form (78%) supports general operating budgets, about 10% goes to student financial aid, and the remaining 12% supports research, agriculture, and medical functions (Laderman & Kunkle, 2022). Although local funding is available for at least one community college in 29 states (Ortagus et al., 2022), state funding and net tuition revenue represent a larger share of total institutional revenue than local appropriations (Dowd et al., 2020). Overall, local revenue made up about 7% of total revenue for public higher education in 2019 (Kelchen et al., 2019).

State Funding for Public Higher Education

As one of the primary revenue sources for public institutions, state funding plays an important role. A large and growing body of research shows positive relationships between increased state resources for public higher education and student outcomes. Chakrabarti et al.

(2020) found that increased spending on four-year universities reduced tuition costs, time to completion, and student debt, while funding for two-year colleges was associated with increased educational attainment and lower student default rates. Bound et al. (2019) found that state cuts led to reduced spending and increased tuition at four-year universities, leading to decreased completion rates and reduced research expenditures. Other research shows a strong connection between state funding levels and completion and enrollments (Monarrez et al., 2021; Deming & Walters, 2017). Other concerns regarding state funding reductions include public universities prioritizing enrolling out-of-state students and crowding out low-income and racially minoritized state residents (Jaquette & Curs, 2015; Jaquette et al., 2016).

Several factors shape the amount of funds that states allocate to public colleges and universities. Much of this research focuses on state funding for higher education during recessionary periods since state economic conditions strain their budgets. Such research generally shows that state funding for public institutions falls during and immediately following recessionary periods before partially recovering (Laderman & Kunkle, 2022; Rosinger et al., 2022a). Other studies test the balance wheel hypothesis, finding disproportionately large cuts for higher education relative to other public expenditures during budget shortfalls (Delaney & Doyle, 2011; 2018).

Research also explores how political conditions influence states' commitment to higher education funding. Generally, states with stronger liberal ideologies and Democratic governors and state legislatures are associated with higher levels of funding for higher education (Ortega, 2020; Tandberg, 2013). However, research has found that states with Republican leadership also support higher education (McLendon et al., 2014; Tandberg, 2010; Tandberg & Griffiths, 2013). With Republican support for higher education substantially eroding since 2016, these earlier

political trends from Republicans may no longer exist in the contemporary political environment (Parker, 2019). Recent research indicates that support for public colleges and universities in Republican-led states experienced deeper budget cuts following the Great Recession (Taylor et al., 2022). However, when there is an overrepresentation of White students in public colleges and universities, Republican-led states support public higher education at higher levels (Taylor et al., 2020). The socio-cultural ties and connections colleges have to powerful political actors in a state may also result in funding decisions that favor institutions associated with powerful politicians in a state (Gándara, 2020).

Conceptual Framework

There are two key theories that inform the ways that states allocate funds to public higher education and how individual institutions may respond. The first is resource dependence theory (RDT), which details how organizations will take steps to obtain the necessary resources to operate and thrive (Pfeffer & Salancik, 1978). This theory suggests that colleges will respond to funding mechanisms that allow them to obtain additional resources while not being responsive to mechanisms that cannot be influenced by institutional actions. It also suggests that colleges that are particularly reliant on state funding will be more responsive to state mechanisms for allocating funds as they do not have other major funding sources available.

The second is principal-agent theory (PAT), which explains how the principal (here, the state government) attempts to shape actions by the agent (here, public institutions) by incentivizing specific actions and disincentivizing others (Jensen & Meckling, 1976). As accountability pressures have grown in public higher education (Kelchen, 2018), funding models have increasingly moved from models that provide unrestricted dollars that institutions are

guaranteed to receive to models that reward institutions for meeting certain state priorities (Hearn, 2015).

Together, resource dependence theory and principal-agent theory offer a framework for understanding how individual institutions are likely to respond to the mechanisms states use to allocate funds and the implications of different funding mechanisms for institutional resources. Resource dependence theory anticipates that public colleges and universities, which historically have been reliant on state governments for a significant share of total revenues, will align their actions in ways that allow them to garner as many funds as possible from the state. In a principal-agent context, this means that institutions will respond (or attempt to respond) to models that encourage institutions to organize their activities around specific incentives. However, institutions that are relatively more reliant on state funding than others, such as community colleges, rural-serving institutions, regional comprehensive universities, and minority-serving institutions, will be particularly attuned to state funding mechanisms.

Even with this special attention to state funding mechanisms, these institutions have historically received less funding per-student than more selective, flagship public universities, meaning that they are less likely to have the resources needed to adequately respond to state incentives to obtain critical resources. For example, rural-serving institutions may struggle to grow enrollments under an enrollment funding model. As a result, they may simultaneously attempt to alter institutional behavior and activities to align with state goals (but that could conflict with institutional mission or goals) while still not generating adequate resources. Equity considerations in funding formulas may help buffer negative funding disparities, directing more funds to historically underfunded institution types or to institutions that need additional resources to support enrollment and/or performance goals.

We use these two theories as the grounding of our conceptual framework. Below, guided by that conceptual framework, we outline the mechanisms behind the state funding of higher education. Next, we summarize prior typologies of state higher education funding. We conclude with the presentation of our novel funding typology.

State Funding Mechanisms

Informed by our conceptual framework, we next discuss the literature that explores the mechanisms states use to allocate funds to public colleges and universities, ranging from negotiations among policymakers to highly technical formulas designed to improve institutional performance. Each funding mechanism states use offers different incentives to institutions, which we tie into our conceptual framework.

Two types of funding mechanisms provide institutions with little incentives to change their actions or to improve performance. The first is to not have a clear funding formula, which then ties appropriations for particular institutions to the whims of legislators or state higher education agencies. This tends to advantage institutions with more alumni in the legislature, which are typically flagship universities (Chatterji et al., 2018; McLendon et al., 2009). This has the potential to create significant equity issues between institutions within a state, further disadvantaging lesser-resourced institutions. The second mechanism is base-adjusted funding (also known as base-plus or incremental funding), which is a consistent percent increase or decrease in allocations across colleges (Syverson, 2020; Hearn, 2015; Layzell, 2007). This mechanism advantages institutions with historically higher funding levels, often shortchanging minority-serving institutions that receive less funding but are still more reliant on state funding as a percentage of total revenue (Harris, 2021; Kelchen et al., 2020). Therefore, while the lack of a funding formula may inject more politicization into the funding allocation process, both

mechanisms are outside of the control of most institutions and maintain existing inequities in funding levels across institution types.

In response to growing enrollments and disparities in the number of students enrolled across institutions, some states moved to enrollment-based formulas in the 1950s and 1960s that provided funds based on the number of students enrolled (Hearn, 2015). States design these formulas to incentivize colleges to increase human capital, as they receive more funds if they enroll more students and fewer funds if they enroll fewer students. Some states add weights to their enrollment formulas to incentivize colleges to expand enrollment in high-demand areas or to recognize differences in the cost of providing education across different fields and levels (Hemelt et al., 2021).

Beginning with Tennessee in 1979 and expanding in earnest in the 1990s, states developed performance-based funding (PBF) formulas to tie funding to student outcomes and increase accountability in higher education (Dougherty et al., 2012; Kelchen, 2018). Early versions of PBF often operated as bonus pools that institutions could earn on top of their regular allocations (Hearn, 2015). This differs from base-adjusted formulas in that the additional funding was spread equally across institutions, while bonus funding under PBF flowed more to certain institutions than others. By the late 2000s, many states redeveloped their performance formulas to include a greater share of funding from base budgets (Ortagus et al., 2020).

States often include equity provisions in their formulas to alleviate perceived inequities among institutions in a sector or to account for differential operating costs. Typically, equity measures focus on characteristics of size, missions, and characteristics of students within a sector (Layzell, 2007; Mullin & Honeyman, 2007). These institutional missions may include being an HBCU or a rural-serving institution that cannot achieve economies of scale or stem from other

forms of long-term historical underfunding. Equity-based student characteristics are not only a part of many performance formulas but can occur in enrollment metrics (Syverson, 2020; Hearn, 2015). Some examples include multipliers or weights for whether the student is a Pell recipient, low-income, adult learner, or of color (Syverson et al., 2020; Cielinski & Pham, 2017). States may apply student equity measures through a set appropriation divided by enrollment measures, formula weighting, or outcome multipliers (Cielinski & Pham, 2017).

Most research on state funding formulas in higher education has focused on PBF. In Fiscal Year 2020, less than 10% of all state funding was allocated via performance, but there was significant variation across states. Seven states tied less than two percent of funds to performance, while Kentucky, Ohio, Tennessee, and North Dakota all used PBF to award at least 70% of state funding (Rosinger et al., 2022b). This PBF research has generally found null or modest positive or negative effects of PBF on access and completion metrics (e.g., Ortagus et al., 2020). Prior studies on the impact of PBF adoption have also revealed unintended consequences such as increased selectivity that disproportionately affects racially minoritized and low-income students (Gándara & Rutherford, 2020; Umbricht et al., 2017). In response, states have adopted equity metrics to encourage colleges to serve student groups that were previously disincentivized from older formulas (Gándara & Rutherford, 2020; Kelchen, 2019). Recent research indicates equity metrics may help offset some of the unintended consequences of PBF (Ortagus et al., 2022; Rosinger et al., 2023).

A limited body of work has looked beyond PBF to examine implications of other funding models for students and colleges. Tandberg (2010a) found that any non-base-adjusted funding formula was associated with increased state appropriations, but Tandberg (2010b) found no relationship. Davis et al. (2021) showed a connection between enrollment weights by field and

level in one community college system and certificate and degree outputs in high-cost and high-need employment areas (Davis et al., 2021).

Though there is little information on how or why states adopt or transition to base-adjusted or enrollment formulas (or enact no formula at all), there is research on adopting performance formulas. Early research on PBF formula adoption indicates an increased likelihood of adoption when states have a Republican-held legislature and a higher education coordinating board (McLendon et al., 2006). Li (2017) pointed to Republican legislatures' strong relationship to PBF adoption, yet, states with more liberal ideologies were significantly more likely to adopt PBF formulas. A Republican governor did not influence the transition to a PBF formula. The study also found that increasing unemployment rates, institutional appropriations, and greater percentage changes in public college enrollment were positively associated with PBF adoption. Finally, Li (2017) found that bordering other PBF-adopting states and states with a greater output of bachelor's degrees and the percentage of people with bachelor's degrees decreases the likelihood of adopting PBF.

Research on factors affecting the adoption of PBF equity metrics found that neighboring states' adoption of PBF equity metrics had no association with the focal state adopting a PBF equity metric (Li & Kelchen, 2021). Meanwhile, a lack of unified Democratic political control and more minoritized and low-income students were associated with a higher adoption rate. Finally, other research highlights the outsized role that philanthropic foundations and policy organizations play in pushing PBF formula adoption throughout states (Miller & Morphew, 2017; Dougherty & Natow, 2015). Whether these sociopolitical factors shape the combinations of base-adjusted, enrollment, and performance formulas is still up for exploration.

Previous Funding Typologies

In this section, we summarize previous efforts to create higher education funding typologies based on snapshots of funding mechanisms. More details about these typologies can be found in Table 1. The first modern typology came from Layzell (2007), who identified five forms of funding: incremental budgeting (base-adjusted), funding formulas or guidelines, performance funding, performance contracting, and vouchers. Layzell then detailed how these five funding models do or do not meet policy makers' desired ends, such as equity or adaptability to economic conditions, as two examples. Though examples are provided for each model, there is no systematic overview of all states.

<Insert Table 1>

Mullin and Honeyman's (2007) typology examined funding formulas at community colleges. Their typology has six models for funding: no funding formula, cost of education, equalized, option, generalized, and tiered. Their typology does not directly include base-adjusted or performance formulas, although base-adjusted could fit under no formula and performance could fit under option as both of these funding mechanisms existed in 2007. Hearn's (2015) typology had three main categories: base-adjusted funding, enrollment-based formula funding, and performance funding. Finally, Syverson (2020) used four funding types: base, base-adjusted, formula, and other. Syverson also detailed the various components of both enrollment and performance formulas. For example, the study documented if the state's system used full-time equivalent (FTE) or headcount in enrollment and how enrollment formulas may account for students from traditionally marginalized socioeconomic or racial/ethnic backgrounds.

Our Funding Typology

Based on our conceptual framework, previous funding typologies, and existing research on state funding mechanisms, we developed a typology of state higher education funding

mechanisms. Aligning with RDT, these mechanisms can be viewed as being on a continuum of the extent to which an institution can influence its funding levels through its own actions. First, we combine what other models frequently define as no funding formula and base-adjusted models into what we call a traditional funding mechanism. Under a traditional funding mechanism, an institution cannot directly influence its funding levels through how it operates. Additionally, even though a base-adjusted model could be considered a formula, it does not have a carefully considered process that attempts to take the particular needs or goals of different colleges into account. This lack of an explicit formula makes base-adjusted models very similar to having no funding formula whatsoever.

On the other end of the continuum, both enrollment-based and performance-based formulas force institutions to compete against each other for a fixed pool of state funding without any type of base-adjusted allocation. This assumes the pool of state funding for public higher education is relatively fixed, which is consistent with per-student state funding levels following economic cycles in recent decades (Laderman & Kunkle, 2021). The purpose is to incentivize colleges to meet the desired metrics in a manner consistent with PAT, and we call these incentive formulas. While performance-based and enrollment-based models have typically been examined separately, they share the common characteristic of forced competition and the risk that improved outcomes do not result in increased funding. For example, even if a college increases enrollment or completions, they risk losing funding if other colleges see larger increases. While this may improve the entire system's metrics in the short term, the lack of return on investment can widen existing resource gaps across colleges (Favero & Rutherford, 2020; Hagood, 2019; Ortagus et al., 2022).

Additionally, there is less of a differential between enrollment-based and performance-based models than is often realized, further justifying consolidation into an incentive-based category. For example, several states include the number of completed credit hours in their performance funding systems; this metric makes up the entirety of higher education appropriations in North Dakota. Models that fund based on the number of students enrolled at the start of the semester are considered enrollment-based, while models that use the number of students who complete those classes are performance-based. From an institutional perspective, PAT would argue that the incentive structure is very similar regardless of when enrollment is measured during the term.

In the middle of the continuum, funding mechanisms can include aspects of both traditional and incentive formulas to balance stability and state objectives. We call these hybrid formulas, and they can take two forms. First, a certain percentage of funding can be allocated based on last year's funding levels while tying the rest to enrollment and/or performance metrics. The second way is to implement hold-harmless or stop-loss provisions in formulas that are ostensibly fully enrollment or performance-based. For example, colleges in the Minnesota State system retain 50% of their previous biennium's budget in the current biennium, and all other money (regardless of whether new funding is available or not) is appropriated through enrollment (Minnesota State, 2020).

Our typology differs from previous typologies in two main ways. The first is that we combined enrollment and performance funding due to our conceptual framework's focus on institutions' ability to respond to the similar incentives that they provide institutions. The second is that we created a hybrid category that reflects aspects of base-adjusted and incentive formulas. Our three-category typology applies equally to two-year and four-year institutions and

accommodates increasingly complex funding mechanisms proposed by states and systems that do not neatly fit in the individual categories that were previously proposed.

Study Procedures

To conduct our study, we collected more than 15 years of data on state higher education funding mechanisms combined with data on state funding levels. The below section details our data and methods.

Data Collection

Our research team compiled the first longitudinal dataset on how states, higher education agencies, or systems allocated funds to public colleges and universities. We followed the guidelines of Kelchen et al. (2019) for collecting state policy data. We collected data by examining state policy documents, including budgets, legislation, and audit reports, as well as higher education board reports, financial statements, and other documents. Our research team reviewed nearly 3,500 documents related to state funding for higher education from fiscal years 2004 to 2020 (academic years 2003-04 to 2019-20). We used the Internet Archive: Wayback Machine to find historical documentation no longer available on active websites. To ensure accuracy and consistency in data reporting and coding, we met weekly as a research team to discuss data collection procedures, interpretations of documents, and complex data decisions until we reached a consensus. Finally, we contacted higher education agencies within states to ask specific questions about data elements that remained unresolved after our data collection efforts.

We set our unit of analysis to match how state legislatures and higher education agencies typically set higher education funding mechanisms. In most states, mechanisms are set for higher

education systems or by the institutional sector (two-year or four-year).[2] We considered two-year

and four-year institutions separately if a system spanned sectors (such as the Minnesota State or

University System of Georgia systems during much of this panel). Sixteen states have multiple

systems within a sector in which different funding models were used for at least part of the

panel.[3] For example, California has two four-year systems (the University of California and the

California State University) and the two-year California Community Colleges. In these cases, we

allowed for multiple observations from the same state. Among the 50 states, there were 59 four-

year systems and 60 two-year systems. In total, there were 2,016 observations among the 119

systems across 17 years in our dataset.

Defining Formulas

We answered our first research question by placing funding models into three categories

based on our conceptual framework. We recognized a system as having a traditional funding

formula if either a base-adjusted formula or no funding formula existed. We recognized a system

as having a base-adjusted formula if one of two conditions were met. The first was that a state or

system clearly stated that there were across-the-board increases or decreases for all institutions.

The second was that if there was no evidence of any other funding formula, we examined

appropriations to all institutions within a system. If the system either increased or decreased

funding across institutions in a sector within one percentage point, we counted that as being

base-adjusted. We only considered a system as having no funding formula if there was no

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[2] We primarily relied on Carnegie classifications to identify institutions and divide them into two-year and four-year institutions. However, we identified three states (Colorado, Tennessee, and pre-2010 Texas) with state-funded certificate-granting institutions that were not in the Carnegie universe. We included those observations in our dataset and classified them as two-year institutions.

[3] Six states had multiple systems at the four-year level only, seven states had multiple systems at the two-year level, and three (New York, Pennsylvania, and Tennessee) had two systems at the four- and two-year level.

evidence of any other funding mechanism and funding data clearly showed that institutions within a system saw different changes in funding.

Systems were considered to have incentive models if they had enrollment and/or performance components. States were marked as enrollment when the funding formula explicitly tied funding to headcount and/or FTE enrollment (frequently student credit hours). We used data from Ortagus et al. (2021) to document whether states had performance funding. This was based on whether colleges in a given sector received varying levels of funding based on student outcome metrics, such as accumulated credit hours, retention rates, or graduation rates. Finally, hybrid models combined both traditional (base-adjusted) and incentive (enrollment and/or performance) components. This included the presence of stop-loss or hold-harmless provisions alongside enrollment and/or performance funding models or models that explicitly tied a share of funding to previous allocations in addition to current enrollment or performance.

Finally, we coded for the presence of equity provisions in state funding models. These provisions took two forms, both of which could be present simultaneously. The first type of equity is institutional equity, in which funding is given based on the characteristics of institutions. This can include additional funding for small or rural institutions that have higher per-student operating costs, or it can include additional funding for HBCUs to comply with desegregation settlements. The second type of equity is student equity, in which funding is tied to the types of students enrolled. These types of equity provisions are frequently included in performance funding systems but can also exist in conjunction with traditional funding models. For example, the University of Wisconsin System had a traditional funding model for most of the panel. However, there was an additional appropriation to the system to support the Lawton Grant

program for underrepresented minority students. These funds were then allocated to individual

institutions based on the number of qualified students (State of Wisconsin, 2003).

Examining Funding Formula Volatility and Equity Metrics

To examine the volatility in funding formulas, we counted the number of times a system

changed within the formula typology (traditional, incentive, or hybrid) between 2004 and 2020.

If a system adopted a new allocation mechanism that fell within one of the three categories in our

typology (such as moving from no formula to base-adjusted within our traditional category), we

did not code a formula change.[4] This is because, per our conceptual framework, a change within

a category does not affect an institution's ability to potentially influence its funding levels

through its own actions.

As an additional measure of volatility, we considered whether states shifted from a

formula that was completely outside of institutions' control (traditional) to a formula that could

be at least partially influenced (incentive or hybrid formulas), or vice versa. We used this coding

to compare state funding changes and equity measures in both sectors. We collapsed changes to

incentive or hybrid models into one category because there were relatively few switches from

incentive to hybrid or vice versa throughout the panel and because we expected funding cuts to

be accompanied by a switch to traditional models rather than switching between hybrid and

incentive models.

For our second research question, we used data on state appropriations from the

Integrated Postsecondary Education Data System (IPEDS) between 2004 and 2019. We

aggregated nominal institutional appropriations to the system level and then created a binary

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[4] Nineteen states use biennial budgets, in which the primary budget is passed for a two-year period instead of a one-year period (National Conference of State Legislatures, 2021). This could reduce the number of opportunities for funding model changes in those states. However, since our panel spans approximately nine biennia, biennial budgeting states had ample opportunities to make changes to funding mechanisms.

variable for whether appropriations decreased by any amount or did not decrease.[5] We then

compared changes in funding formulas to decreases in appropriations to see whether state higher

education agencies and legislators moved to protect base appropriations when funding decreased

or used cuts as an opportunity to adopt a funding formula that puts at least a portion of

institutional appropriations at risk. Conversely, as funding volatility includes both increases and

decreases (Delaney, 2023), we also considered whether states used years with funding increases

to introduce a new funding mechanism.

To answer our third question concerning the volatility in equity measurements, we first

documented whether a state either retained an equity provision, lost an equity provision, or

gained an equity provision from one year to the next. The coding allowed us to compare the

transitions in the funding formula (e.g., transition to incentive/hybrid or transition to traditional)

and whether a sector retained, gained, or lost its equity provision. We also considered the extent

to which reductions in state appropriations were associated with adding or abandoning equity

provisions. Our expectation, based on our conceptual framework, was that systems would

retrench to traditional models when state funding decreased and that changes to hybrid or

incentive models would frequently be accompanied by the addition of equity metrics to help

support institutions with diverse missions and/or student bodies that may have fewer resources to

respond to the incentives in funding mechanisms. These varied descriptive analyses allow us to

more holistically examine how states fund higher education and how that has evolved.

Results

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[5] We also examined the data using -0.5% and -1% as the thresholds for cuts, which excludes about 15% and 25% of all cuts, respectively. The results do not change.

In this section, we present results for each of our three research questions, beginning with showing data on trends in state funding models and then addressing how volatility in state funding relates to volatility in funding models and equity metrics.

Trends in State Funding Models

The two panels of Figure 1 show trends in funding models for the two-year and four-year sectors between Fiscal Years 2004 and 2020. Appendix 1 contains system-level details for the entire panel. In the two-year sector, hybrid models have been the most popular of the three main funding models throughout the panel, with the number of systems ranging from a low of 28 in 2004 to a high of 37 in 2010. Traditional models were the second most popular model during this period, with the number of systems adopting traditional models increased from 16 in 2009 to 24 in 2011. Following the Great Recession, the number of traditional models slowly dropped to 11 by 2020. Incentive models were present in between 10 and 12 systems for all years except 2010-2013, where only six or seven systems had incentive models. The number of systems with equity metrics steadily rose throughout the panel, increasing from 16 in 2004 to 32 by 2017.

<Insert Figure 1>

Among four-year universities, traditional models were the most popular throughout the vast majority of the panel. The number of systems with traditional models dipped from 34 to 29 just before the Great Recession before increasing to 38 by 2010. The number slowly fell to a low of 27 in 2020, when it was eclipsed by hybrid models (28). Hybrid models ranged between 19 and 24 systems through 2016 before increasing at the end of the panel. Between two and seven systems had incentive models, including four systems in 2020. Finally, equity models ranged between 14 and 20 systems through 2012 before increasing to 29 systems in 2020.

We also considered the percentage of state funds allocated by each of our three main funding models using Fiscal Year 2019 data from IPEDS. In the four-year sector, just over 58% of funds were allocated based on hybrid models that include both traditional and incentive components. About 36% was allocated using traditional models, and the remaining 6% was dispersed using incentive models. About 56% of all funds were allocated to systems with equity components. In the two-year sector, 74% of funds were allocated using hybrid models, 19% using incentive models, and 7% using traditional models. Seventy-eight percent of all funds were allocated to systems with equity components. The disparity between the share of systems using a funding model and the share of funds allocated using a particular model is due primarily to smaller systems being more likely to use a traditional funding model.

Funding Formula Volatility

Throughout the period, four-year systems had greater formula volatility than two-year systems (see Figure 2). On average, 4.4 four-year state systems changed formulas in a year compared to 2.9 two-year systems. There were relatively few changes in formulas before the Great Recession for both the two- and four-year sectors. Both sectors hit their first peak of 7 (two-year) and 6 (four-year) in 2010. The other peak occurred in 2014, when six two-year and 12 four-year systems changed formulas. The number of changes slowed down again until Fiscal Year 2020, which saw five changes in either sector. Overall, since the Great Recession, both the two- and four-year sectors have had greater volatility in their funding formula.

<Insert Figure 2>

In both the two-year and four-year sectors, not changing funding models during the panel was the most common outcome. Thirty-seven of 60 two-year systems and 29 of 59 two-year systems saw no changes in the 17-year period. Some of these funding mechanisms have been

around for a long time. For instance, the only changes made to the University System of Georgia's funding formula since 1984 were revisions made in 2002 to reflect a switch from quarters to semesters and to incorporate technology expenses (authors' communication with University System of Georgia staff). Fifteen two-year and 19 four-year systems saw one or two changes, while eight two-year and 11 four-year systems had three or more changes. The four-year sector in Kansas saw the most changes (seven), which is largely due to a performance funding system that only existed during years of state appropriations increases. In other years, Kansas had a traditional funding model.

When pairing formula volatility with changes in state aid to a sector, we found indications that transitions to traditional formulas often occurred alongside funding decreases in both sectors (see Table 2). Approximately one-third of the system-year observations in our dataset contained funding decreases, but ten of the 14 shifts from incentive/hybrid formulas to traditional formulas in the two-year sector and 16 of the 27 shifts in the four-year sector took place in years with funding decreases. On the other hand, when states switched from a traditional formula to a hybrid or incentive formula, the share of funding decreases was more similar to the full sample (10 of 38 shifts in the four-year sector and 8 of 26 shifts in the two-year sector). The finding suggests that states and systems retrench to base-adjusted models or pause funding formulas when appropriations decrease. However, moving to an incentive or hybrid model is not primarily driven by funding increases or decreases.

<Insert Table 2>

Equity Provisions and Funding/Formula Volatility

In Figure 1, we highlighted the growth in equity provisions within higher education funding strategies. In this section, we examine whether adding or removing equity provisions are

associated with other changes in funding models or cuts in state appropriations. We first explored whether systems added or removed equity provisions when they changed funding models (from traditional to hybrid/incentive or vice versa). During the period of the panel, no system added an equity provision when it switched from hybrid/incentive to traditional while nine systems removed equity provisions. Combined with our previous finding that systems were more likely to revert to traditional funding models when there were funding cuts, this suggests that systems went to across-the-board cuts when they faced financial challenges without an effort to protect the most vulnerable students or institutions. However, they were also more likely to abandon equity provisions that had been built into funding formulas. On the other hand, fifteen systems added equity provisions when they moved from traditional to incentive/hybrid funding models while only one system removed an equity provision. Much of this comes from the adoption of PBF models with equity metrics, but some is also due to institutional equity provisions added to models with enrollment-based funding.

Table 3 examines whether adding or removing equity provisions is related to cuts in state funding. Here, we find differences in these relationships by institutional sector. Among two-year institutions, equity provisions were much more likely to be added than removed (ten cases versus two) when state appropriations decreased. When funding was increased or stable, equity provisions were added on 16 occasions and removed on ten occasions. In the four-year sector, funding decreases yielded an almost equivalent number of adding (eight cases) and removing (seven cases) equity provisions. However, funding increases much more frequently involved adding (21 cases) than removing (eight cases) equity provisions.

<Insert Table 3>

Discussion

States invest nearly $100 billion annually toward public higher education. Yet, we know little about how states fund public colleges and universities besides the 10 percent allocated through performance funding mechanisms (Rosinger et al., 2022b). Without understanding the various mechanisms through which states fund higher education and how these have changed over time, researchers and policy analysts cannot fully comprehend how funding formulas shape college access and student success. Additionally, no research beyond the performance funding literature considers whether states change their funding formulas when budget cuts are necessary.

In this paper, we provide a theory-driven typology of state funding approaches for public higher education and conduct the first detailed longitudinal examination of descriptive trends in state higher education funding strategies. We find that over time only a few two-year systems continue to operate under traditional forms of funding, while traditional formulas continue as a top choice for funding public universities. While the number of systems with incentive models has varied over time, there is a trend to blend both the traditional and incentive formulas into a hybrid model that still protects a base level of funding for institutions. While the use of equity continues to increase over the period, we find that this is most likely to occur during implementing incentive or hybrid formulas. Equity provisions are more likely to be removed during the transition to traditional formulas. The trend suggests that this change to a traditional formula, which often occurs during economic downturns, may adversely affect colleges that serve historically underserved student groups or regions.

When states provide less funding for higher education, state higher education agencies and system leaders often face difficult choices in making the least painful cuts to students and institutions. During the period studied, we account for changes surrounding the Great Recession

and the initial phase of the pandemic. Our data indicate an initial retrenchment to traditional funding formulas during budget cuts, while results were mixed regarding equity funding provisions. While the retrenchment was more substantial during the Great Recession, it also peaked three years after the fallout of the recession in 2008. Policymakers may have made this choice to protect any individual campus from bearing a larger share of budget cuts. Still, these choices have the effect of making an unequal higher education system even more unequal.

While much academic discussion focuses on the implications of total or per-student funding (Monarrez et al., 2021; Deming & Walters, 2017; Delaney & Doyle, 2011; 2018), there is little research on the variability in how institutions receive these monies. We found that while the most common outcome for a system was to see no change in funding formula, more than half of four-year systems and nearly half of two-year systems changed funding models during the panel. If institutional leaders do not expect their funding mechanism to stay steady for long enough to make changes, they are unlikely to respond meaningfully. This reality could undermine states' PAT-aligned efforts to increase accountability of higher education institutions given that the institutions do not have faith that the states will consistently provide funding for certain outcomes. Though there is research on how administrators navigate the implementation of PBF (e.g., Rosinger et al., 2021), there are questions about the effects of weathering frequent changes in other formulas. The recommended best practice from state higher education agencies is a clear cycle for reviewing formulas and a framework for the reviews (Pinkard et al., 2022). This recommendation suggests that institutional leaders may be more willing and better able to respond to occasional changes in more predictable funding models. This is consistent with the idea that, under resource dependence theory, institutions will seek to alter their behavior and

activities in ways that can increase their ability to garner external resources, but that their ability to respond accordingly may be limited.

Future Research

Our data collection effort and descriptive analysis of state higher education funding typologies provide an essential starting point in the field. As such, we raise numerous suggestions for future research. The first is to continue to collect more detailed data on the share of funding allocated based on different funding mechanisms. The detailed data is particularly true for hybrid funding models that can vary considerably in the share of funding protected through base-adjusted or hold-harmless provisions compared to the incentive component. The share of funding tied to performance ranges from less than one percent to 100% across states (Rosinger et al., 2022b), and it is crucial to understand these differences for all funding mechanisms.

It is also crucial to understand how states construct their equity provisions and whether they are sufficient to help close gaps in an increasingly stratified public higher education system (Taylor & Cantwell, 2019). Although research on PBF systems suggests that equity provisions can help reduce declines in the enrollment of minoritized students (Gándara & Rutherford, 2020; Kelchen, 2019), there is also some evidence that these provisions may not be large enough to counteract other incentives to enroll students from historically advantaged groups (McKinney & Hagedorn, 2017) or reduce racial disparities in enrollment (Rosinger et al., 2023). The size of equity provisions and the extent to which these provisions provide colleges with adequate funds to educate students is an area of research ripe for needed exploration.

Perhaps the most critical question facing researchers and policymakers is determining which funding strategy is the most effective in improving student outcomes such as enrollment

and completion among their students. Research on performance funding (e.g., Ortagus et al., 2020) has found generally muted effects on student outcomes, but there is no research examining the effects of other funding strategies on college access and success. Our paper provides a path forward for this work, and we also urge researchers to define the comparison group for their analyses carefully. For example, comparing institutions with and without performance funding models creates a comparison group of colleges that operate under a range of traditional, hybrid, and incentive funding models. That reduces the utility of comparison for policymakers trying to decide between their current funding strategy and a new model.

In addition, there is a body of research on how states' sociopolitical and financial characteristics shape public support for higher education and the implementation of PBF systems (Hamilton & Nielsen, 2021; Li & Kelchen, 2021; Li, 2017; McLendon et al., 2006). In using formulas, there is little information on how these characteristics shape other formulas, combinations of formulas, or year-to-year volatility. Policymakers' responses during recessionary periods are of particular interest, and particular attention should be paid to the role of local policymakers' responses in the community college setting due to the important role of local communities in financing institutions in some states. Our analysis finds a retrenchment toward traditional funding models that may exacerbate resource gaps compared to maintaining a hybrid or incentive-based model. Our work to detail funding typologies provides researchers with a new way to examine these critical policy questions.

Finally, it would be useful for future research to investigate how states' funding decisions may have shifted in light of the pandemic funding to higher education through the CARES Act, HEERF, and GEER funds. It is unclear how this funding would influence state leaders as it was a one-time injection of additional funds with significant portions earmarked for direct student aid.

Scholars can extend the current study to explore how states reacted to these emergency funds. Additionally, as enrollment levels across higher education have yet to recover from the pandemic, it is important to conduct research understanding the implications of different funding formulas for colleges that have seen large declines in enrollment relative to the smaller share of institutions that are thriving.

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Table 1: Summary of previous funding model typologies.

Authors	Sector	Categories
Layzell (2007)	Both	**Incremental (Baseline)**-Past year's allocation is the base of the current allocation. Adjustments are made to the budget by the state based upon expected changes and needs.
		Funding Formulas and Guidelines-Mechanisms that determine how to allocate some or all funds to colleges. These can include instruction, research, and support activities.
		Performance Funding-Formulas that award funding based upon performance indicators.
		Performance Contracting-State agrees to provide a certain amount of funding for meeting certain performance levels or goals.
		Vouchers-Institutions do not receive money directly from the state; instead, students receive a stipend that they can take to eligible institutions.
Mullin & Honeyman (2007)	Two-Year	**No Formula**-Institutions are not funded on the basis of a common calculation or formula.
		Cost of Education-Formulaic approach that adjusts for a student's program of study in order to take operating costs into account.
		Equalized-Additional aid to equalize funding across colleges based on available taxable resources.
		Option-Funding formulas can change based on the economic or other conditions of a state.
		Generalized-Within states, institutions funded based on the same functional components.
		Tiered-Formulas that account for variation in different costs. Variations include differences in field of study, square footage for facilities, and required student services.
Hearn (2015)	Both	**Base-Adjusted**-Policy makers increased or decreased funding based on prior values.
		Enrollment-Formulas funding institutions based upon enrollment, which may vary based on field of study.
		Early Performance Funding-Small portions of funding tied to the meeting of certain performance metrics.
		Outcomes-Based-Increasingly complex funding formulas that tie a greater amount of funding to various performance metrics.
Syverson et al. (2020)	Both	**Base**-Level funding.
		Base-Adjusted-Policy makers increased or decreased funding based on prior values.
		Formula-Any kind of formula that determines funding. These formulas include enrollment/enrollment metrics, performance/performance metrics, and accounting for faculty, facilities, and student support services.
		Other

Figure 1a: Trends in funding models (two-year)
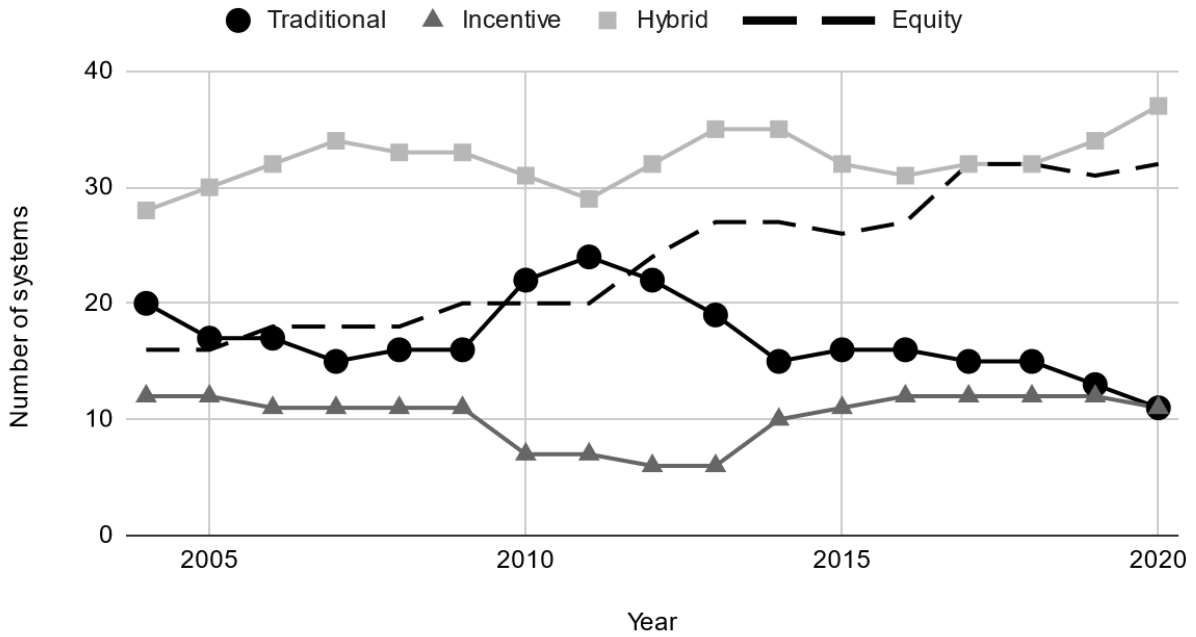
Figure 1b: Trends in funding models (four-year)
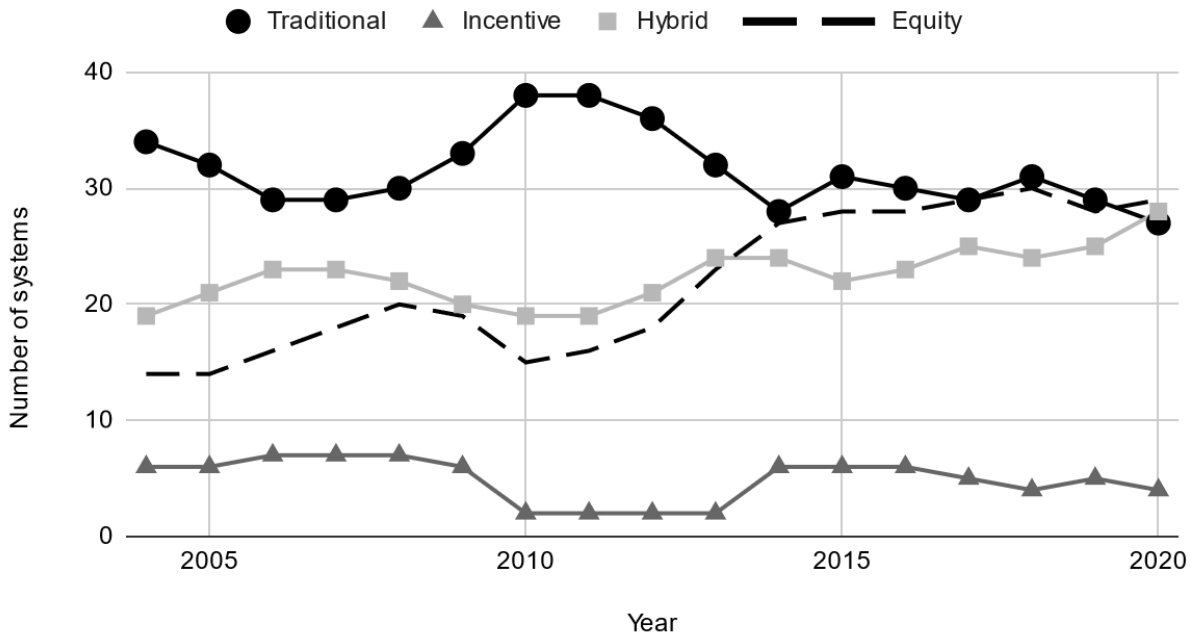
Figure 2: Trends in funding model volatility
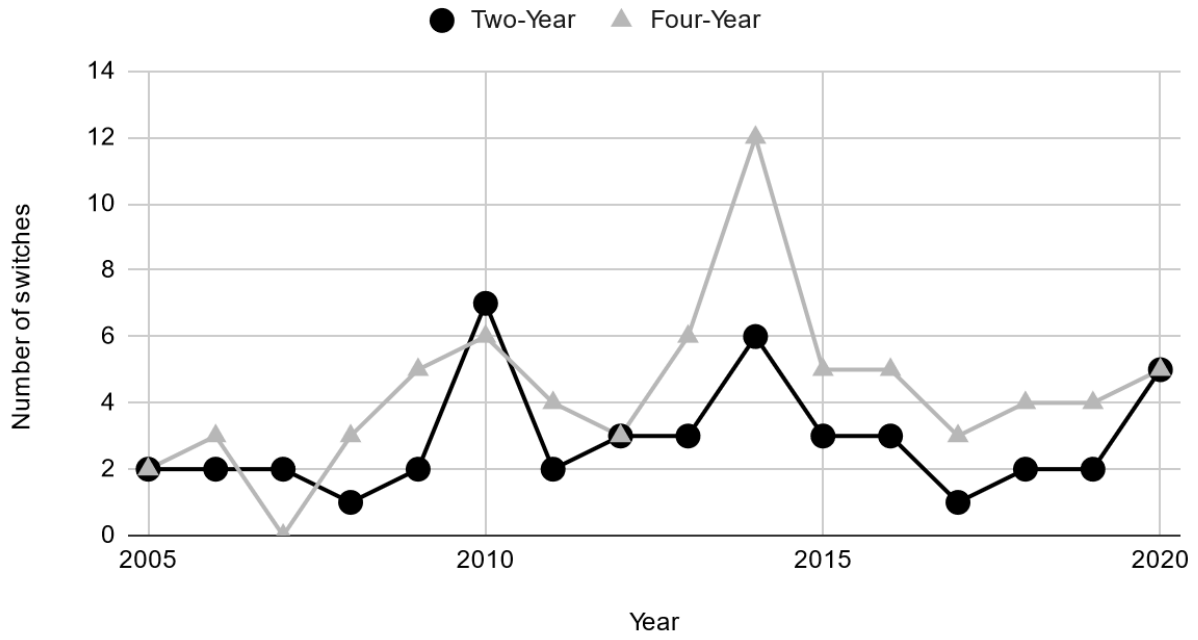
Table 2: Comparing changes in funding models to changes in state appropriations.

| | Two-Year | | | | | | Four-Year | | | | | |
| | Overall | | Hybrid/Incentive to Traditional | | Traditional to Hybrid/Incentive | | Overall | | Hybrid/Incentive to Traditional | | Traditional to Hybrid/Incentive | |
Year	No Cut	Cut	No Cut	Cut	No Cut	Cut	No Cut	Cut	No Cut	Cut	No Cut	Cut
2005	50	7	0	0	2	0	44	15	0	0	2	0
2006	50	6	0	0	1	0	51	8	0	0	1	2
2007	52	5	0	0	1	1	57	2	0	0	0	0
2008	53	4	1	0	0	0	55	4	2	0	1	0
2009	28	30	0	1	1	0	22	37	0	4	1	0
2010	12	46	0	6	0	1	15	44	0	5	0	1
2011	32	26	0	2	0	0	29	30	0	2	1	1
2012	30	28	0	0	1	2	17	42	0	0	1	2
2013	38	20	0	0	1	2	39	20	1	0	4	1
2014	49	9	0	0	6	0	50	9	2	1	9	0
2015	48	8	2	0	1	0	39	20	2	2	1	0
2016	38	18	0	1	1	1	50	9	0	1	3	1
2017	38	19	0	0	0	1	36	23	0	1	1	1
2018	37	20	1	0	1	0	38	21	3	0	0	1
2019	43	14	0	0	2	0	47	12	1	0	3	0
Total	598	260	4	10	18	8	589	296	11	16	28	10

Note: A "cut" refers to a year-over-year decline in nominal state appropriations within that system/sector. "No cut" refers to either level funding or an increase.

Table 3: Comparing changes in equity provisions to changes in state appropriations.

	Two-Year					
	Overall		Funding cut		No funding cut	
Year	Removed equity	Added equity	Removed equity	Added equity	Removed equity	Added equity
2005	0	0	0	0	0	0
2006	0	1	0	1	0	0
2007	1	1	1	1	0	0
2008	0	0	0	0	0	0
2009	0	2	0	0	0	2
2010	2	2	0	0	2	2
2011	1	1	1	0	0	1
2012	0	4	0	1	0	3
2013	1	4	1	4	0	0
2014	3	3	3	3	0	0
2015	1	0	1	0	0	0
2016	0	1	0	1	0	0
2017	0	5	0	3	0	2
2018	1	1	1	1	0	0
2019	2	1	2	1	0	0
Total	12	26	10	16	2	10

	Four-Year					
	Overall		Funding cut		No funding cut	
Year	Removed equity	Added equity	Removed equity	Added equity	Removed equity	Added equity
2005	1	1	1	1	0	0
2006	0	2	0	1	0	1
2007	0	2	0	2	0	0
2008	1	3	1	3	0	0
2009	1	0	0	0	1	0
2010	5	1	2	0	3	1
2011	0	1	0	1	0	0
2012	0	2	0	0	0	2
2013	0	5	0	3	0	2
2014	0	4	0	4	0	0

2015	1	2	0	2	1	0
2016	2	2	1	2	1	0
2017	1	2	0	1	1	1
2018	1	2	1	1	0	1
2019	2	0	2	0	0	0
Total	15	29	8	21	7	8

Appendix 1: Funding model by state/system and year, Fiscal Years 2004-2020.

State	Two-year colleges				Four-year universities			
	Traditional	Incentive	Hybrid	Equity	Traditional	Incentive	Hybrid	Equity
Alaska	2004-14				2004-20			
Alabama	2004-18		2019-20	2019-20	2004-20			2004-20
Arkansas			2004-20	2004-20			2004-20	2004-20
Arizona	2004, 2011-12, 2020		2005-10, 2013-19	2004-20	2004, 2009-12, 2015, 2018-20		2005-08, 2013-14, 2016-17	2013-15
California (UC, CCC)			2004-20	2017-20	2009-10, 2014-15		2004-08, 2011-13, 2016-20	2012-20
California (CSU)					2009-10, 2013		2004-08, 2011-12, 2014-20	2016-20
Colorado (most)	2004-05	2016-19	2006-15, 2020	2006-20	2004-05	2016-19	2006-15, 2020	2004-20
Colorado (Aims CC & CO Mtn.)	2004-20							
Connecticut (UConn)					2004-20			
Connecticut (CSU)			2004-20				2004-20	
Delaware	2004-20				2004-20			
Florida			2004-20	2009-20			2004-20	2015-20
Georgia (USG)			2004-20				2004-20	
Georgia (tech colleges)			2004-20	2004-20				
Hawaii			2004-20	2012-20	2004-16		2017-20	2017-20
Iowa	2004, 2008, 2016-19		2005-07, 2009-15, 2020		2004-20			2013-16
Idaho	2004-06, 2011-12		2007-10, 2013-20	2013, 2017	2008, 2011-12		2004-07, 2009-10, 2013-20	2007
Illinois		2004-20		2004-20	2004-12, 2015-20	2013-14		2013-20
Indiana		2004-09	2010-20	2009-20		2004-09	2010-20	2004-20

Kansas			2004-20	2012-20	2004-05, 2010-12, 2014, 2016-18		2006-09, 2013, 2015, 2019-20	2007-20
Kentucky	2004-17		2018-20	2018-20	2004-17		2018-20	2018-20
Louisiana	2015-16	2004-11	2012-14, 2017-20	2010-14, 2017-20	2015-16	2004-11	2017-20	2010-14, 2017-20
Massachusetts (UMass, two-year)	2004-13, 2018-20		2014-17	2014-18	2004-20			
Massachusetts (others)					2004-13, 2018-20		2014-17	2016-18
Maryland (most)		2004-20		2004-20	2004-20			
Maryland (Baltimore City CC)	2004-20							
Maine (most)	2004-20				2004-13, 2019-20		2014-18	2014-18
Maine (ME Maritime Academy)					2004-20			
Michigan	2004-06, 2010-11		2007-09, 2012-20	2004-12, 2020	2004-05, 2008-12		2006-07, 2013-20	2004, 2006-08, 2015-20
Minnesota (U of MN system)					2004-07, 2010-11, 2018-20	2008-09, 2012-17		2008-09. 2014-17
Minnesota (MN State system)			2004-20	2012-13, 2016-20			2004-20	2008-09, 2014-20
Missouri	2004-12		2013-20	2014-20	2004-13, 2017-20		2014-16	2005-9
Mississippi			2004-20	2006	2004-13, 2015-20		2014	2004-20
Montana (MT University system)	2010-11	2014-20	2004-09, 2012-13	2013-20	2010-11	2014-20	2004-09, 2012-13	2013-20
Montana (others)		2004-07	2008-20					
North Carolina			2004-20	2004-20			2004-20	2004-15

North Dakota	2004-13		2014-20	2004-20	2004-13		2014-20	2004-20
Nebraska			2004-20	2004-13	2004-20			
New Hampshire	2004-20				2004-20			
New Jersey			2004-20		2004-19		2020	2020
New Mexico			2004-20	2013-20			2004-20	
Nevada	2010-13	2004-09, 2014-20		2004-20	2010-13	2004-09, 2014-20		2014-20
New York (SUNY)		2004-20		2004-18	2009-20	2004-08		
New York (CUNY)		2004-20			2004-20			
Ohio		2015-20	2004-14	2010-20		2014-20	2004-13	2004-20
Oklahoma	2015-19		2004-14, 2020	2012-20	2015-19		2004-14, 2020	2012-20
Oregon		2004-20				2004-15	2016-20	2008-09, 2011-20
Pennsylvania (PASSHE, Thad. Stevens)	2004-20						2004-20	2004-20
Pennsylvania (others)	2010-15	2004-05	2006-09, 2016-20		2004-20			
Rhode Island	2004-18		2019-20		2004-18		2019-20	2018-20
South Carolina (USC)	2010-20	2004-09		2004-09	2010-20	2004-09		2004-09
South Carolina (SCTCS)	2010-13	2004-09, 2014-20		2004-09, 2017-20				
South Dakota					2004, 2011-12, 2014-20		2005-10, 2013	
Tennessee (UT, community colleges)			2004-20	2007-20			2004-20	2007-20
Tennessee (other four-years, TCATs)			2004-20				2004-20	2004-20
Texas (tech colleges)	2014-20		2004-13	2004-20				

	Col1	Col2	Col3	Col4	Col5	Col6	Col7	Col8
Texas (others)			2004-20	2011-20			2004-20	2004-20
Utah (tech colleges)	2009-17	2018-20	2004-08					
Utah (others)	2004-16		2017-20	2013-20			2004-20	2013-20
Virginia			2004-20	2017-20			2004-20	
Vermont (Vermont State)	2004-20				2004-19		2020	
Vermont (UVM)					2004-20			
Washington			2004-20	2004-20	2004-20			
Wisconsin		2004-20		2004-20	2004-18	2019-20		2004-20
West Virginia	2004-20				2004-20			
Wyoming			2004-20	2004-10	2004-20			

Source: Authors' data collection

Notes:

(1) If some institutions within a system have a different funding model in a given year, we show the most common model in this table.

(2) Blank rows indicate there were no institutions within that sector.