

NEW EVIDENCE ON THE EVOLUTION AND LANDSCAPE OF PERFORMANCE FUNDING FOR HIGHER EDUCATION

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Introduction

Operating within a broader policy environment that emphasizes heightened accountability across government agencies (Moynihan, 2006) and public concerns regarding college affordability and the value of postsecondary education, policymakers have increasingly focused efforts on holding colleges accountable for improving their performance (Kelchen, 2018a). At the state level, accountability efforts have frequently taken the form of performance-based funding (PBF), in which public colleges and universities receive a portion of state funding based on credit hour completion, retention, degree completion, or other student outcome metrics (Dougherty et al., 2016). In 2020, U.S. states budgeted more than \$6.1 billion for performance funding, representing approximately 9% of total state general funds allocated to public colleges and universities (authors' calculations).

Despite empirical evidence indicating PBF has not consistently led to improvements in associate and bachelor's degree completion (Hillman et al., 2018; Hillman et al., 2014; Sanford & Hunter, 2011; Shin & Milton, 2004; Umbricht et al., 2017; Ward & Ost, 2021), it remains a popular approach. Advocacy groups and policy intermediaries have also wielded substantial power in setting state higher education agendas and promoting PBF adoption (Gándara et al., 2017; Miller & Morpew, 2017; Orphan et al., 2021). As PBF becomes increasingly popular, there have been sporadic efforts to collect state-level snapshots of PBF and place states into broad typologies based on various policy features (Boelscher & Snyder, 2019; Burke & Minassians, 2003; Dougherty & Natow, 2015; Friedel et al., 2013; Gándara & Rutherford, 2020; Hagood, 2019; Larocca & Carr, 2020; Li, 2018; National Conference of State Legislatures (NCSL), 2015).

To analyze impacts of PBF, researchers have relied on prior data collection efforts and readily available policy documents to stitch together panel datasets. To date, more than 50 peer-reviewed studies have examined the intended and unintended consequences of PBF (Ortagus et al., 2020). However, researchers have disagreed about whether certain states had PBF in a given year or whether a state ever had PBF. These discrepancies exist for several reasons. First, for earlier years, many policy documents are no longer available online. Second, states frequently have PBF policies in statute without the legislature appropriating funding for performance. Third, some states have language authorizing PBF even though higher education agencies actually use different funding models.

In addition to a lack of consensus regarding whether and when states had PBF, existing peer-reviewed studies that examine the impacts of PBF typically rely on binary indicators for whether a state had PBF in a given year or not, collapsing states that tie less than 3% of funds to performance (e.g., Arkansas and Michigan) into the same category as states that tie 70 to 100% of funds to performance (e.g., Kentucky, North Dakota, and Ohio) (Ortagus et al., 2020). Since there is no systematic data on the share of funds allocated for performance, researchers have not been able to consider how the strength of a particular PBF system shapes outcomes. Advocates contend that PBF is more effective when more funds are at stake, as this incentivizes colleges to prioritize student success (Boelscher & Snyder, 2019), but data limitations have prevented researchers from testing this hypothesis.

Despite a lack of evidence that PBF improves degree completion, PBF has become a common feature of state funding for public higher education. Current policy discussions, therefore, often center around *how* to design PBF systems to improve outcomes and reduce longstanding educational inequities. Yet a lack of systematic, detailed information regarding the features of PBF over time prevents researchers from offering this type of policy-relevant evidence. In this paper, we leverage nearly four years of data collection to create the first-ever detailed longitudinal dataset on state PBF policies with two research aims:

1. To document trends in the characteristics and strength of PBF over the last two decades, and
2. To provide a snapshot of the current landscape of PBF in 2020.

In particular, we document the prevalence of PBF across states (including when systems are authorized and when they are actually funded), the sectors subject to performance, the metrics on which colleges are evaluated, and the specific equity metrics states include in PBF systems (low-income, racially minoritized, adult, and/or academically underprepared students). While prior research has offered detailed descriptions of PBF (e.g., Dougherty & Natow, 2015) or snapshots of PBF features (e.g., Boelscher & Snyder, 2019; Burke & Minassians, 2003; Friedel et al., 2013; Li, 2018; NCSL, 2015), our study represents the first large-scale effort to reconcile prior accounts of PBF and document specific features of PBF systems as they emerged as a common funding mechanism for state governments. Our findings document the scale of variation in policy

design across PBF systems (and within PBF over time), highlight the importance of moving beyond reducing states to PBF-adopters or non-adopters to consider the impacts of specific PBF features, and lead us to complicate some of the common characterizations of PBF in research and policy discussions.

Consistent with other descriptive research in education (see Loeb et al., 2017), this study seeks to describe trends and variations in PBF, improve our understanding of these policies, and provide insight into causal relationships observed in prior research. In this vein, our paper makes several key contributions to the PBF literature. First, we resolve discrepancies regarding the presence of PBF across states, the years policies exist through legislation, and the years legislatures actually funded PBF by offering a comprehensive, longitudinal analysis of these policies over time. Second, we offer the best and most-detailed evidence to date of the characteristics and strength of PBF in 2020 as well as their evolution over the last 24 years. Specifically, we offer evidence regarding the prevalence of PBF across states over time, the sectors subject to PBF, the amount and share of funds at stake under PBF, the metrics on which institutions are evaluated, and whether and how states build equity metrics into PBF. Finally, this paper, which accompanies a publicly available PBF dataset (Authors, 2021), lays the foundation for future research that examines whether and under which conditions PBF can promote more equitable outcomes for students and institutions.

Background

The logic of PBF and its subsequent outcomes is typically informed by a principal-agent relationship (Jensen & Meckling, 1976; Spence & Zeckhauser, 1971), in which the principal (here, a state government) provides funding for the agent (public colleges) to complete a task (e.g., graduating students). PBF is designed to increase degree attainment by providing financial incentives for colleges to improve completion outcomes, but policies designed to alter institutional behavior can lead to intended and unintended consequences (Kelchen, 2018a). For PBF, intended consequences include increased credit hour completion, retention rates, graduation rates, transfer to four-year institutions, and/or the total number of college graduates. Despite the proliferation of PBF, prior research typically shows it does not lead to substantial improvements in degree completion (Bell et al., 2017; Li, 2021; Ortagus et al., 2020).

However, PBF policies can also yield unintended consequences as public colleges respond to incentives to increase degree completion in ways the principal did not intend (Dougherty et al., 2016). Performance management literature contends that performance-based reforms in the public sector rarely work as intended and often lead to unintended outcomes (Thompson, 1999). Additional work in this area suggests these reforms typically incentivize desired outcomes but fail to account for complexities of institutional structures and political realities (Radin, 2000). Given the well-established tradition of reform failure, Andrews and Moynihan (2002) described performance-based reform initiatives as a “triumph of hope over experience” (p. 283).

Public college administrators have raised concerns that PBF policies may fail to achieve intended aims and even exacerbate existing inequities by restricting access among underserved students (Jones et al., 2017). Research has revealed these policies have resulted in decreased enrollment among low-income and racially minoritized students (Birdsall, 2018; Kelchen & Stedrak, 2016; Gándara & Rutherford, 2020; Umbricht et al., 2017) as well as institutional gaming of the system by focusing on short-term certificates rather than longer-term degrees (Hillman et al., 2018; Hillman et al., 2015; Li & Kennedy, 2018; Li & Ortagus, 2019) and an inequitable funding structure for public universities (Hagood, 2019).

To address concerns about the ineffectiveness and inequity of PBF, several states have altered their PBF formulas. Researchers have noted that more recent PBF systems typically move performance funds from bonus funds to base state appropriations, which suggests colleges could now *lose* a share of base state appropriations. These policies also often put a larger share of funding at stake, with some states allocating more than 10% for performance (Dougherty & Natow, 2015). However, existing PBF data does not allow researchers or policymakers to identify which states allocate more than 10% for performance.

States have also included equity metrics that focus on promoting access and success among underserved students (Dougherty et al., 2016; Hillman & Corral, 2018). Analyses examining the effects of these metrics have revealed conflicting results. Kelchen (2018b) found equity premiums led to enrollment increases among Black students but not among other racially minoritized or low-income students at public four-year colleges. Gándara and Rutherford (2018) also focused on public four-year colleges but found equity premiums *decreased* Black student enrollment while increasing enrollment among Latinx and low-income students.

Existing literature that aims to understand the intended and unintended effects of PBF is limited in two key ways. First, there is not a consensus among researchers, advocacy organizations, and others regarding what states have had PBF and the years these systems existed. Table 1 shows discrepancies across various data collection efforts regarding PBF-adopting states and policy years. Among four prominent longitudinal data collection efforts, there is not a single state with PBF that researchers consistently agree on the years in which PBF was in effect.

See Table 1. Prior PBF Data Collection Efforts

Prior data collection efforts do not consistently identify states as PBF states. For instance, Burke and Minnassians (2003) listed California as having a PBF system for community colleges from 1991 to 2001, but other data sources do not identify California as a PBF state. For states that sources consistently identify as having performance funding, documentation of PBF years often differs. Arkansas is consistently identified as having PBF, but the years of PBF existence vary with longitudinal data collection efforts noting the presence of PBF in 2001 (Burke & Minassians, 2003), in various periods in the late 1990s through 2014 (Dougherty &

Natow, 2015), and only in recent years (Gándara & Rutherford, 2020; Hagood, 2019; Larocca & Carr, 2020). Oklahoma similarly varies in the dates it has been identified as having PBF, with some noting a system that began in the late 1990s and early 2000s (Burke & Minnasians, 2003; Dougherty & Natow, 2015; Larocca & Carr, 2020) and others identifying a program that began in 2012 or 2013 (Hagood, 2019; Gándara & Rutherford, 2020). Arizona is considered as having PBF beginning in 2012 (Dougherty & Natow, 2015), 2013 (Gándara & Rutherford, 2020; Hagood, 2019), and 2014 (Larocca & Carr, 2020), and NCSL lists the state as having PBF in 2015, a year our evidence indicates the system existed in legislation but was not funded. Documentation for Colorado, Florida, Illinois, New York, South Dakota, Virginia, and other states show discrepancies both in whether the state had PBF and the years it operated.

Second, researchers also face data limitations when it comes to understanding how specific policy features shape the intended and unintended consequences of PBF. Absent detailed information regarding specific features of PBF, researchers have relied on binary PBF policy variables indicating the presence or absence of PBF in a given year, which erases heterogeneity across policies in the amount and share of funds at stake, the metrics on which colleges are evaluated, and the specific student groups states include in equity metrics.

Table 2 lists features of peer-reviewed articles that examine the intended and unintended consequences of PBF policies in multiple states, including the policy variables used in each. We draw this list from Ortagus et al. (2020) and focus only on studies that use a difference-in-differences design because these studies aim to identify the causal effect of PBF. Of 12 national studies, 4 use only a binary PBF indicator, sometimes including the length of time a policy has been in place to estimate effects over time. The other eight studies consider binary PBF design features, including whether a policy can be considered PBF 1.0 (linking bonus funding to performance) or 2.0 (linking base funding to performance), the “robustness” of a policy based on an existing typology, or whether a policy includes incentives such as STEM degree production or metrics for enrolling and/or graduating underserved students.

See Table 2. Features of quasi-experimental national studies examining impacts of PBF

To date, no PBF study identified in a recent systematic review (Ortagus et al., 2020) has considered specific performance metrics on which colleges are evaluated or how the share of funds at stake under PBF impacts outcomes. Since PBF policies tie anywhere from less than 1% to 100% of funds to performance, national studies that group any PBF-adopting state, regardless of the share of funds at stake, together result in estimates that conflate the impacts of higher- and lower-dosage policies. A handful of studies in Table 2 have examined PBF 1.0 versus 2.0 policies, but this distinction masks substantial differences in the share of funds at stake in PBF that ties base appropriations to performance. From a theoretical perspective, the strength of an incentive likely shapes how responsive an agent is to the principal’s goals. From a policy perspective, policymakers are left

with little evidence regarding how much funding should be at stake to achieve particular outcomes due to a lack of detailed PBF policy information.

Together, the lack of consensus regarding what states had PBF and when as well as the necessary treatment of heterogeneous policies under a broad “PBF-adopting” umbrella highlights the need for accurate and detailed data on the evolution and landscape of PBF. The extent to which PBF is able to achieve its intended goals and mitigate disparities likely varies depending on how these policies are designed and implemented. To better understand impacts of PBF, researchers and policymakers need a clearer picture of the variations in policy design across and within states over time. This paper presents data from the most detailed longitudinal PBF dataset to date to describe the evolution and current state of PBF in order to document the scale of variation in policy design. In doing so, we resolve discrepancies in whether and when states had PBF, offer the most comprehensive data to date documenting the features of PBF, and lay the foundation for future research examining whether and under what conditions PBF can promote more equitable outcomes.

Data Collection and Research Methods

Our research team spent nearly four years constructing a dataset consisting of detailed information about PBF from fiscal years 1997 to 2020. To collect these data, we drew on primary source policy documents, such as state budgets, legislation, and audit reports, as well as higher education agency or system reports and financial statements. Our research team reviewed more than 2,000 documents related to PBF. The research team met weekly to discuss data collection and ensure documents were interpreted consistently across team members. When discrepancies occurred or information was unclear, we went back to primary source documents and discussed discrepancies as a team. We leveraged the expertise of state higher education executive officers for clarification of policy details or when information was unavailable. We describe our data collection protocol in more detail in Authors (2019).

We defined performance funding as policies that tied any amount of state funds for higher education to prior student outcomes (e.g., number of students earning a degree, graduation rates). Policies that did not tie funds to prior student outcomes, for instance, ones rewarding research efforts only, were not coded as PBF. We made this restriction because most of the scholarly research on PBF has focused on student success metrics (and subsequent student outcomes) and because most state initiatives included these metrics. We did not code policies that provided funding based on the promise of future improvements in student outcomes as PBF since they were not based on prior student outcomes.

The first variable of interest is a three-category measure of PBF in a given year by sector (two-year or four-year): no PBF in place for the sector, approved-but-unfunded PBF in place for the sector, or approved and funded PBF in place for the sector. Unlike most prior research, we distinguished between PBF that was

authorized and PBF that was actually funded. We considered a system approved if state statute allowed for the possibility of funds to be allocated based on performance in a given year. This excludes transition years if colleges knew they would not have funding at risk in those years. If a state board requested PBF but did not have the authority to allocate funds, we did not consider that an approved system. We considered a state to no longer have PBF if there was still a formula on the books that allowed a governing board to use PBF, but the board stopped requesting funds. This happened in Maine, Massachusetts, and Mississippi during the 2010s. If a state or system suspended PBF to review the formula or for financial reasons, we considered those states as not having PBF in that year. Although we created a three-category PBF variable distinguishing between approved (but not funded) PBF policies and active, funded PBF policies, our descriptive analyses, with the exception of Figure 1 that shows the prevalence of unfunded and funded PBF over time, focuses on PBF policies that were actually funded. This variable indicates whether a state budgeted funds based on student outcomes for public colleges in a sector in a given year.

We also collected continuous measures of the amount and share of state general fund appropriations tied to performance by sector each year. We noted whether PBF was part of base appropriations, whether it was a bonus colleges could receive in addition to base funds, or whether it was new state funds (i.e., funds above prior year allocations were based on performance). We also captured data on the performance metrics used in a given year and noted whether states allowed institutions to choose one or more of the metrics on which they were evaluated. We coded for the existence of eight types of common metrics by sector: credit hour completion (number of credit hours completed); student progression toward a degree (persistence, retention, students completing threshold numbers of credit hours); transfer (students transferring in for four-year sector and students transferring to another institution for two-year sector); time to degree (graduation rates or reduced excess credit hours among completers); number of credentials awarded (number of certificates, associate degrees, bachelor's degrees, and for research universities, sometimes master's, doctoral, or professional degrees); degree production in STEM fields; degree production in health fields; and labor market outcomes (job placement rates, graduate earnings). We coded these at key intervals during our analytic period (1997, 2000, 2005, 2010, 2015, and 2020) to understand the prevalence of various metrics and how specific metrics have changed over time.

Our final set of PBF measures were binary indicators for whether states operated equity-oriented metrics in a funded PBF system for each year. We first created a binary indicator for whether PBF had any of the four common equity-oriented metrics in a given year (low-income, racially minoritized, adult, or academically underprepared students). We then created a binary variable for each of the four equity-oriented metrics indicating whether PBF included the specific student group. For our descriptive analysis, we drew on these variables to examine how PBF has evolved over the last two decades and the features of PBF in 2020.

Findings

We organize our findings by key features of PBF: the prevalence of PBF, the institutions impacted and the amount and share of funds at stake, the performance metrics considered, and whether states include equity-oriented metrics in PBF and what student groups are included (low-income, racially minoritized, adult, and/or academically underprepared students). Within each key feature, we give an overview of the evolution of PBF and a snapshot of PBF in 2020.

PBF Prevalence

Figure 1 shows PBF prevalence across states in 1997, 2000, 2005, 2010, 2015, and 2020. In 1997, five states had funded PBF systems, and two (Minnesota, Arkansas) had PBF policies on the books that they did not fund. Nine states had PBF systems in 2000, all of which were funded. In 2005, seven states had funded PBF systems. In 2010, 10 states had funded PBF systems and 4 (Arkansas, Florida, Kansas, Hawai'i) had unfunded policies. By 2015, 25 states had funded PBF systems and 5 had policies on the books that they did not fund (Arizona, Arkansas, Illinois, Mississippi, Oklahoma). In 2020, 32 states had funded PBF systems and one had an unfunded system (Missouri).

See Figure 1. PBF States

Prior research generally points to an early wave of PBF adoption in the 1990s, an abandonment during the early 2000s recession, and a later, more widespread wave of adoption in the mid-2000s (Dougherty et al., 2016), which is reflected in the overall trends in Figure 1. Our analysis indicated that the prevalence of PBF across states typically follows this pattern, but growth has not necessarily been linear within these two waves. Rather, this overall growth masks individual states' experimenting with PBF, implementing, abandoning, and re-implementing PBF over time. Our analysis also shows a wave of PBF adoption in the 2010s in post-Great Recession years, particularly between 2010 and 2015 when the number of states with funded PBF increased from 10 to 25, that prior research has not highlighted. Table 3 lists the 41 states with PBF at any point between 1997 and 2020 by sector alongside authorized and funded years.

See Table 3. States with PBF, FY1997-2020

Although PBF continues to gain popularity, seven states (Arizona, Maine, Massachusetts, Minnesota, Mississippi, New York, Pennsylvania) paused or abandoned PBF between 2015 and 2020. The PBF model that has long been used by the Pennsylvania State System of Higher Education (PASSHE) is currently not in use during a system governance reform. New York shifted its funding approach in 2018, and state funding to two-year institutions is no longer based on performance. In 2019, Maine ended PBF, which had been in place for the university system since 2014.

States across the South highlight the differences that exist in PBF adoption and funding across the country. On the one hand, several states have invested heavily in PBF. Tennessee and Kentucky link most state funds for both sectors to performance. Florida's high-stakes PBF requires institutions to place a percentage of base funds into a performance pool and risk losing funds. By contrast, several states have either been surprising holdouts of PBF. Perhaps chief among these is Georgia, which prior data collection has identified as having PBF (Dougherty & Natow, 2015). Starting in 2011, the former governor and the University System of Georgia sought to implement PBF, but we did not consider it a PBF-adopting state because the legislature never actually approved or funded PBF. Other states in the South have PBF policies in place but do not fund them. From 2009 to 2011, Texas funded a PBF policy for four-year colleges but has since stopped funding the program and currently only allocates PBF for two-year colleges.

Our analysis helps resolve discrepancies across prior data collection efforts and offers a greater understanding of how PBF has operated over time. First, we found that states frequently enacted PBF through legislation but did not use the formula to allocate funds. Twenty-one percent of all enacted PBF observations in the four-year sector and 16% of two-year enacted observations were years with no funding tied to student outcomes. This means that if institutions only react when funding is truly at stake, combining funded and unfunded PBF observations reduces the observed effects of PBF. Missouri, for instance, funded an early PBF system for both sectors from the 1990s to 2001. The Coordinating Board for Higher Education approved a new PBF system in 2002, but the state did not allocate funds for it. The state later approved and funded PBF from 2014 to 2016, tying 1-5% of funds to performance, but the governor withheld performance funds in 2017. While the formula is authorized by the Missouri Department of Higher Education and state statute requires 90% of new state funds to be allocated based on performance, the legislature has not used this model since 2017.

Second, we identified several states with PBF systems that researchers and advocacy organizations had not previously considered PBF. While researchers agree PBF exists in Michigan, and our analysis finds the current version for both sectors was authorized and funded beginning in 2013, several others missed an earlier, short-lived PBF policy that funded four-year colleges based partly on degree completion in 2006 and 2007. South Carolina was an early PBF adopter, with prior research concluding the system existed from sometime in the late 1990s to the early 2000s. Our analysis shows legislation took effect in 1996 and required the Commission on Higher Education to develop performance funding, which was implemented in 1998. Although legislation required all funds be allocated based on outcomes by 2000, funding peaked at 7.6% of general funds in 2002 before being discontinued. South Carolina has kept a "performance funding" line item in the budget, but funding is used to improve system outcomes rather than reward performance. Since then, the state has been considered to not have PBF by sources in Table 1. Yet the South Carolina Technical College System has used performance funding to allocate a portion of state appropriations since 2014. The model includes metrics for

placement, licensure, persistence, and completion, and funding increased from \$1.1 million in 2014 to \$4.4 million in 2020.

Third, we found that some states previously considered to have PBF did not tie funds to prior student outcomes. Researchers have considered Louisiana's GRAD Act, a 2010 governance reform bill, as PBF (e.g., Hu, 2019). In exchange for greater autonomy on issues such as tuition-setting, the legislation mandates performance agreements between the Louisiana Board of Regents and public colleges. However, we do not consider this PBF because it does not tie funding to student outcomes. Some studies considered the state to have started PBF in the late 1990s or early 2000s. While we found the coordinating board approved a PBF system linking funding to student outcomes in 2001, it was not included in a state budget until 2017. California has also been considered in prior research as having PBF for the two-year sector in the late 1990s and early 2000s, but we did not classify the Partnership for Excellence as PBF because it provided funds to improve future performance rather than reward prior outcomes.

Finally, we clarified periods of existence for numerous PBF systems. Several studies found Colorado funded a policy in the late 1990s with other versions appearing sporadically since then (Burke & Minnasians, 2003; Dougherty & Natow, 2015; Gándara & Rutherford, 2018; Larocca & Carr, 2020) while one study did not classify the state as having PBF (Hagood, 2019). Our findings adjust these dates as funded from 2001 to 2003 (approved but not funded in 2004) and not approved and funded again until 2016. We also found different dates for PBF in Virginia. Previous research has splintered findings on the exact date of PBF adoption, either beginning in 2005 with a state-level governance reform or in 2011 when the State Council for Higher Education in Virginia adopted institutional performance metrics. We concluded neither effort constituted PBF, as they did not tie appropriations to student outcomes. Rather, we identified a funded PBF policy starting in 2017 for the Virginia Community College System.

[Institutions Impacted and Funds at Stake](#)

The institutions and sectors subject to PBF vary across states, with some applying PBF to all public colleges, others to four-year or two-year colleges only, and some to specific institutions within a sector or system. Tennessee and Ohio have long-standing PBF policies for public colleges and universities. Tennessee implemented performance funding in 1979 with the Quality Assurance Program that awards bonus funds based on measures of student learning and institutional effectiveness. The state enacted a second, larger system in 2010 that allocates 80% of funds for each sector based on performance. Ohio's legislature enacted PBF that by 2020 tied 80% of state funds for public four-year colleges and 100% for two-year colleges to performance.

Kentucky, Pennsylvania, Wisconsin, and Minnesota, among others, applied PBF to specific institutions within a sector. The PASSHE Board of Governors enacted PBF in 2001 that applied to Pennsylvania's regional

comprehensive universities. Pennsylvania State University and other state-related universities are not subject to PBF. Minnesota funded PBF systems for the University of Minnesota system (four-year sector) and the MnSCU system (both sectors) in 2008-2009 and 2012-2017. The state stopped budgeting PBF in 2018, but MnSCU operated a system that put 1% of funding at stake in 2018 and 2019 before abandoning it in 2020.

The first panel in Figure 2 shows the number of funded PBF systems in each sector from 1997 to 2020. Until 2005, a relatively similar number of funded PBF systems existed in the two- and four-year sectors. From 2005 to 2011, the number of states funding PBF for the two-year sector stayed relatively constant while there was growth and then decline in the number of funded four-year systems. After 2012, the number of funded PBF systems expanded in both sectors but grew more rapidly in the two-year sector. In recent years, PBF growth has occurred primarily in systems where either both sectors or the two-year sector only are subject to PBF. In 2020, there were 30 funded PBF systems in the two-year sector and 22 funded PBF systems in the four-year sector. Across states, the most common approach is to apply PBF to both sectors: 22 states in 2020 funded PBF for both sectors, 8 states had PBF for only two-year colleges (Alabama, California, Connecticut, North Carolina, South Carolina, Texas, Virginia, Washington), and 2 states (Oregon, New Jersey) had PBF for only four-year colleges.

See Figure 2: Number of Funded PBF Systems, Total Funding, and Median Percent of Funds Budgeted by Sector, 1997-2020

The second panel in Figure 2 shows the total amount of state general funds, in 2020 dollars, budgeted for performance over the last 24 years by sector. In 1997, the five funded PBF systems for two-year colleges budgeted \$39.4 million for PBF, a number that grew to \$2.1 billion across 30 funded PBF systems for the sector by 2020. For four-year colleges, the four funded PBF systems in 1997 budgeted \$78.5 million for performance; by 2020, 22 funded PBF systems in the sector budgeted \$3.9 billion for performance. In 2020, states budgeted a total of \$6.1 billion in general fund appropriations for public colleges and universities based on performance.

The median percent of funds at stake for both sectors in states with funded PBF systems has also grown (Figure 2, third panel). With some fluctuation, this figure grew from around 1.7% of state general funds for the two-year sector and 1.3% of funds in the four-year sector in 1997 to around 7% and 6.6%, respectively, in 2020. As evidenced in Figure 2, the growth in the number of funded PBF systems, the total funds budgeted, and the median percent of funds all began to climb between 2010 and 2012, indicating a growing prioritization of performance funding in years following the Great Recession. This again points to a previously not described wave of PBF adoption in the 2010s.

These overall trends mask variation in funding levels across states. In 2020, Arkansas, Connecticut, Illinois, Michigan, North Carolina, Washington, and Utah each tied less than 2% of general funds to performance. Colorado, Florida, Louisiana, Nevada, Texas, Virginia, and Wyoming budgeted 15-20% of funds for performance. Kentucky budgeted 70% of general funds for PBF, Tennessee budgeted 80%, Ohio budgeted 80% for four-year colleges and 100% for two-year colleges, and North Dakota tied 100% to performance.

Despite this variation, PBF remained a relatively weak policy lever in most states. Across both sectors, half of states with funded PBF systems in 2020 tied less than 7% of funds to performance and three-quarters tied around 20% or less to performance. Figure 3 shows states shaded based on quartiles of funds at stake by sector in 2020.

See Figure 3. Percent of Funds at Stake by Quartile in Funded PBF Systems, 2020

Several PBF states, particularly ones with a large share of funds at stake, included “stop-loss” or “hold-harmless” provisions to protect colleges from unexpected losses under new funding systems. Kentucky included stop-loss and hold-harmless provisions during a three-year phase-in from 2018 to 2020. The first year, a hold-harmless provision prevented institutions from losing funds. Stop-loss provisions in years two and three prevented institutions from losing more than 1% and 2% of funds, respectively. Ohio similarly included stop-loss provisions that were phased out for both sectors by 2015.

Another way to transition to a new funding system was to gradually increase the share of funds at stake. Nevada, which enacted PBF for both sectors in 2015, phased in its program over a four-year period during which 5% of funds were tied to performance the first year, 10% the second, 15% the third, and 20% from there. Ohio’s funding formula for the two-year sector began to move from an enrollment- to outcome-based model in 2011, tying between 5 and 10% of funds to performance for the first three years then increasing to 50% in 2014 and 100% in 2015. The state budgeted 80% of funds for performance for four-year colleges starting in 2010, without a similar transition period.

There was also variation in whether states handled performance funds as base or bonus funds. If performance funds were a share of the base appropriation, colleges could lose money that would have otherwise been allocated and would likely see no increase in their allocation. Bonus funding, however, was extra money institutions could receive on top of base funds. Tennessee simultaneously operates base and bonus programs: the Quality Assurance Program awards bonus funds based on performance metrics, while the Outcomes Based Funding model links 80% of base appropriations to performance.

Some states applied PBF only to new state funds, or the increase in budgeted funds from the prior year. Kansas, for example, enacted performance contracts in 2006 in which public colleges negotiate contracts with the state that include efforts to improve student outcomes, and the state awards new funds based on performance on

agreed-upon metrics. In several years, our analysis showed no new funds were available due to budget constraints. We considered those years to be approved but not funded.

Within these variations, however, as a lever to encourage institutions to improve outcomes, PBF represents a relatively small share of funds in most states and includes protections against large losses in many states that tie a larger share of funds to performance. Additionally, in some states, PBF is not funded when new funds are unavailable or when funding levels do not reach a specified threshold.

Performance Metrics

Variation in the metrics on which institutions are evaluated creates challenges for researchers and policymakers seeking to understand the landscape and impacts of PBF. Table 4 lists the 32 states with funded PBF systems in 2020 and indicates whether (and for what sectors) states included each of eight outcome metrics. The most common metric across states was the number of credentials awarded. Just four states did not include this metric: Connecticut, North Dakota, South Carolina, and Vermont (Wisconsin considers the number of credentials for its four-year sector only; Florida considers the number of credentials awarded for the two-year sector only while Texas considers it for community colleges but not technical colleges). Other common metrics focused on students' progression toward a degree and transfer outcomes. Twenty-one states included a metric for at least one sector for progression toward a degree and 19 states included a metric for at least one sector for transfer outcomes.

See Table 4. Funded PBF System Performance Metrics, 2020

States also commonly included metrics for degree completion in STEM and/or health fields in 2020. Twenty-one states included a metric for STEM credentials and eighteen included a metric for health field credentials for at least one sector. Oregon added STEM and health degree completions to its existing PBF four-year system in 2016; Kentucky's PBF system, implemented in 2018, includes STEM and health credentials for both sectors. Sometimes metrics include degree completion in fields deemed "high value" or "high demand." In these cases, we looked for documentation for how the state defined high value and high demand, typically finding an overlap with STEM and/or health fields. While the number of credentials, progression toward a degree, and transfer outcomes existed in some early PBF systems, metrics for degree completion in STEM and health fields represent a relatively newer PBF feature. No funded PBF system in either sector included a STEM or health field metric prior to 2000. In 2001, Pennsylvania added metrics for STEM and health fields for four-year PASSHE system institutions but it remained the sole state with these metrics until 2005 when South Dakota added STEM fields for its four-year sector. Until 2008, no funded two-year system included STEM or health field metrics. Since then, the number of two- and four-year systems with these metrics grew over time to include more than half of PBF systems in each sector, but they remain more prevalent in four-year systems (60% of funded two-year and 73% of funded four-year systems had STEM and/or health metrics in 2020).

Just under half of states with funded PBF included metrics focused on credit hour completion in 2020. North Dakota's PBF system has tied all state funding for public colleges and universities based on credit hour completion (weighted by field and level to account for costs associated with different course offerings) since 2014. Similarly, just under half of states in 2020 included a metric aimed at reducing time to degree. For example, Florida's four-year system included metrics for the percent of bachelor's degrees awarded without excess credit hours and four-year graduation rates. Some early PBF systems included metrics for credit hour completion and time to degree (for example, South Carolina included credit hours earned and graduation rates for both sectors in its early PBF system), but they have become more common as PBF has expanded over the last decade.

Performance metrics in a smaller number of states focused on labor market outcomes, such as job placement and graduate earnings. For example, in 2011, the Texas legislature adopted a formula for technical colleges based on wages of graduates relative to the minimum wage. Labor market metrics have been longstanding but less common features of PBF, with some early systems including labor market metrics. In 1997, Florida and Tennessee included a labor market metric for their two-year but not four-year systems. Both states later added labor market metrics for their four-year PBF systems. In the late 1990s, Missouri, Kentucky, and South Carolina included labor market metrics in PBF for both sectors. By 2020, eight states had funded PBF systems with labor market metrics: Florida and Tennessee were the only states we identified with labor market metrics for four-year colleges while eight states (including Florida and Tennessee) had labor market metrics for two-year colleges.

PBF sometimes included metrics negotiated or chosen by colleges, often from a menu of options. Pennsylvania's PBF policy included 10 metrics relating to student success, access, and stewardship. Five of the metrics were mandatory, and institutions selected the others, including two indicators not on the list. The State University System of Florida allows public four-year colleges to choose among 10 metrics, such as four-year graduation rate, median wages of graduates, percent of undergraduates with a Pell grant, and bachelor's degrees awarded in high-demand areas. Kansas institutions develop metrics from the board's strategic plan, which focuses on increasing attainment, aligning higher education and state economic needs, and institutional excellence. This "choose your own adventure" approach may limit the effectiveness of PBF if colleges select metrics on which they are likely to succeed. Alternatively, it offers flexibility to shape metrics according to institutional mission.

Equity-Oriented Metrics

Another feature of PBF is equity-oriented provisions, which often apply to low-income, racially minoritized, adult, and/or academically underprepared students. Figure 4 shows states with funded PBF for the two-year

sector coded as having equity considerations if they included a metric for low-income, racially minoritized, adult, and/or academically underprepared students in 1997, 2000, 2005, 2010, 2015, and 2020.

See Figure 4. Equity Metrics for Funded Two-Year PBF Systems

Although researchers often consider equity-oriented metrics a newer feature of PBF, our findings indicated equity considerations were not limited to recent PBF systems. Some early systems in the late 1990s and early 2000s included equity metrics that could be considered models for robust PBF systems by today's standards (Boelscher & Snyder, 2019). In 1997, three of the five states with funded two-year PBF systems included at least one equity metric, and four out of seven funded two-year systems in 2000 included at least one equity metric.

Figure 5 shows the presence of equity-oriented metrics in funded four-year PBF systems, again highlighting the existence of early PBF systems with equity components. In 1997, two of the four states with funded four-year systems included at least one equity metric, and three out of six funded four-year systems in 2000 included at least one equity metric.

See Figure 5. Equity Metrics for Funded Four-Year PBF Systems

Missouri's early PBF system, funded from 1994 through 2001, provided funds for public colleges and universities for each low-income and racially minoritized student who graduated. Under a new PBF system funded from 2014 to 2016, the state did not provide equity metrics. New Jersey included success rates among low-income students as a metric for two-year colleges and academically underprepared students for four-year colleges in its early 2000s PBF system. Kentucky's early system, which the state stopped funding after 1998, included metrics for adult and academically underprepared students for both sectors.

In 2020, nearly all PBF states included at least one equity metric: 22 out of 30 funded PBF systems in the two-year sector and 20 out of 22 in the four-year sector included an equity-oriented metric. PBF in North Dakota and Vermont did not include metrics for either sector for any of the identified groups in 2020. Connecticut, Florida, Michigan, Rhode Island, South Carolina (technical colleges), and Wyoming did not include metrics for the two-year sector for any of the identified groups.

The student groups included in equity-oriented metrics vary across states. Table 5 lists states with funded PBF systems in 2020 and indicates whether each state includes a metric for low-income, racially minoritized, adult, and/or academically underprepared students by sector. In 2020, 21 out of 30 funded two-year and 20 out of 22 funded four-year systems included a metric for low-income students. Fourteen two-year and fifteen four-year systems included a metric for racially minoritized students. Eleven two-year and eight four-year systems included a metric for adult students. Ten two-year and six four-year systems included a metric for academically

underprepared students. Although the most common equity metrics focused on race and income, more systems incentivized colleges to serve low-income students (70% of two-year and 90% of four-year systems) than racially minoritized students (just under half of two-year and 70% of four-year systems).

See Table 5. Funded PBF System Equity Metrics, 2020

As examples of the various ways states approached equity-oriented metrics, Arkansas, Kansas, Ohio, and Tennessee funded PBF for both sectors with metrics for each of the identified student groups. Tennessee, however, included racially minoritized students in its smaller PBF system (and only as a recommended metric), but not in its larger PBF system that accounts for 80% of state funding for public colleges and universities. Florida included success metrics for each identified group for four-year colleges but none were included in its system for two-year colleges. Some states have chosen to exclude race as an equity metric while providing funds for colleges that graduate low-income, adult, and academically underprepared students. Illinois and Texas, for instance, included metrics for low-income, adult, and academically underprepared students but not for racially minoritized students.

Some states used equity metrics to focus on specific underserved groups in their state, in addition to other identified student groups: Montana included metrics for Native American students, and Hawai'i included metrics for Native Hawai'ian students. Other states defined equity more narrowly, focusing on one of the identified groups. North Carolina's two-year PBF system included a success metric for academically underprepared students. PBF in California, Indiana, Michigan (four-year PBF only), New Mexico, Oklahoma, and Utah only included equity-oriented metrics for low-income students.

Our findings indicate states have made strides toward building equity considerations into PBF, but there is still work ahead. Prior research offers promising evidence that equity metrics can mitigate unintended impacts of PBF (Gándara & Rutherford, 2018, Kelchen, 2018b). However, the specific targeted student groups are likely to shape the extent to which equity provisions are effective levers for reducing disparities.

Discussion

An expanding body of literature on performance funding for higher education has examined its impact on college access, degree completion, institutional funding, and institutional behavior (Bell et al., 2018, Li, 2021; Ortagus et al., 2020). But there is little consensus and no systematic documentation within the existing literature regarding which states have PBF, when it was legislated, when it was funded, or how these systems have operated over time. Additionally, previous literature generally does not consider variation across states (and within states) in policy design over time, such as the amount and share of funds at stake in performance systems or the specific metrics on which colleges are evaluated.

This study provides an up-to-date, detailed analysis of state-level PBF systems to reconcile differences in existing reports and highlight variations in policy design through a snapshot of PBF systems as they exist in 2020 and their evolution over the last 24 years. Our findings confirm prior research indicating two waves of PBF adoption, the first in the 1990s and a later wave in the mid-2000s (Dougherty et al., 2016). But these first two waves are much smaller than the number of PBF adoptions following the Great Recession in the 2010s. We also find that within this broader trend, individual states are experimenting with PBF much more than prior research has indicated, with states adopting, suspending, abandoning, reimplementing, and altering PBF systems over time. States also frequently approve PBF systems to operate in a given fiscal year and then do not fund them, creating a sizable share of observations in which researchers may obtain different results without making that distinction clear. These constant changes may help explain discrepancies in PBF years in prior analyses, as some studies have focused on funded years (Gándara & Rutherford, 2020; Hagood, 2019; Tandberg & Hillman, 2014; Tandberg et al., 2018), others have focused on authorized years (Li & Kennedy, 2018), and others do not indicate whether they consider authorized or funded years.

Although PBF has undergone major changes over the last two decades, it has become a mainstay of state higher education funding for public colleges and universities. An important contribution of our analysis is that we are able to quantify the role PBF plays in funding public higher education across states. In 2020, states budgeted an estimated \$6.1 billion for performance funding in higher education, linking around 9% of total general fund appropriations to performance outcomes. Forty-one states have had PBF systems at some point, and 32 states currently allocate a portion of funds based on student outcomes. Despite its increasing prevalence across states, we find performance funding is still a relatively weak policy lever in most states, with half of states tying less than 7% of funds for both the two- and four-year sector to performance in 2020 and states often including stop-loss or hold harmless provisions that prevent institutions from losing more than a small amount of funds based on performance. In some states, PBF exists in legislation or board approval but is rarely, if ever, funded, raising questions about the extent to which public colleges respond to policies that are not actually used. Existing PBF research has distinguished between early and later PBF systems (PBF 1.0 and 2.0), with a key distinction being bonus versus base funding tied to performance metrics. However, our study indicates a more nuanced and potentially important distinction is the share of funds at stake since many base and bonus PBF systems tie a small share of funds to performance while a smaller number of base systems link most state funding to performance.

One additional distinguishing feature prior research has made between earlier and later PBF systems is equity bonuses built into the latter (Ortagus et al., 2020). However, our findings show that equity bonuses existed in some early PBF policies and in some cases were stronger than current PBF systems. Equity metrics have become a common feature of PBF, with most PBF states including equity metrics; however, how states define equity varies considerably. Race-focused metrics are not included in equity provisions as often as metrics

targeting low-income students, possibly reflecting policymakers' hesitance to explicitly include race in higher education funding formulas (Gándara, 2020). Less than half of two-year PBF systems and 70% of four-year PBF systems link state funding to colleges' enrollment and/or graduation of racially minoritized students.

When it comes to student outcome metrics used to determine funding allocations, our study indicates the metrics on which institutions are evaluated have expanded to include closer workforce connections, such as degrees in STEM and health fields and labor market outcomes, such as job placement rates and earnings. We also find performance funding is sometimes a “choose your own adventure” model in which institutions select the metrics on which they are evaluated. As they do so, a remaining question is the extent to which equity will be compromised if institutions seek to optimize their likelihood of success under PBF as opposed to supporting underserved students.

These findings complicate our understanding of PBF and entail important implications for an expanding body of PBF research that examines the effects of these policies. First, our study clarifies the existence and funding of PBF systems in a systematic way across states over time, offering a way to clearly identify institutions subject to PBF in given years and allowing researchers and policymakers to more definitively examine the effects of PBF. Our study also offers insight into specific ways PBF varies across states, such as the amount and share of funds tied to performance, the metrics on which institutions are evaluated, and the student groups states include in equity-oriented metrics. In addition, this paper is accompanied by a publicly available dataset (Authors, 2021) that allows researchers to examine how the variations identified in this paper shape student and institutional outcomes. Finally, this study coincides with new developments in difference-in-differences methods that are frequently used to evaluate the impacts of PBF and that are appropriate for time-varying treatment adoption (Callaway & Sant'Anna, 2020) or continuous treatment (e.g., PBF dosage) (Callaway et al., 2021). Future research might leverage findings from this paper and its accompanying dataset that systematically identifies policy years and features with recent methodological advances to offer additional insight into the effects of PBF.

PBF continues to be popular in a political environment in which new state funds are frequently coupled with greater accountability (Kelchen, 2018a). But researchers have wondered whether the discontinuations of PBF that occurred in prior years could resurface (Dougherty & Natow, 2015). As some states enter lean budget years in the midst of COVID-19 and the economic downturn, higher education institutions are likely to face severe declines in state appropriations, which may lead some states to abandon PBF. Colorado proposed a 5% cut across the board for higher education and did not use its PBF formula in 2021 while it transitions to an equity-focused formula (Gonzales, 2020). In contrast, New Jersey used its PBF formula with metrics for low-income and racially minoritized students in 2021 (Government Finance Officers Association of New Jersey, 2020) and Massachusetts re-adopted PBF (Massachusetts Board of Higher Education, 2021). This suggests

that unlike during previous recessions, PBF could garner political support during lean budget years going forward.

If states abandon equity provisions as they implement or alter funding formulas, however, they may also move away from one tool at their disposal to prioritize equity. PBF systems that explicitly link state funds to the success of racially minoritized students—something we find in less than half of two-year and three-quarters of four-year PBF systems—may represent one strategy to promote equity in college access and success. While states vary substantially in equity considerations, states like California and New Jersey appear to be implementing PBF as a strategy to build equity into funding formulas, which have historically focused on enrollments and prior allocations. Despite the enormous stakes associated with PBF, data are limited and, as a result, little is known regarding whether and how PBF can be designed to promote more equitable outcomes. Our study offers guidance and data to researchers seeking to undertake studies that examine these questions.

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Table 1. Prior PBF Data Collection Efforts

	PBF Snapshots				PBF Longitudinal			
	Friedel et al. (2013)	NCSL (2015)	Boelscher & Snyder (2019) ¹	Burke & Minnasians (2003)	Dougherty & Natow (2015) ²	Hagood (2019) ³	Gándara & Rutherford (2020) ³	Larocca & Carr (2020) ⁴
Years	2013	2015	2019	1997-2003	Ending 2014	1994-2014	1993-2014	1990-2016
Alabama	Transitioning	None	In place (two-year)	None	None	None	None	None
Alaska	None	None	None	None	None	None	None	None
Arizona	In place (four-year)	In place (four-year)	None	None	2012-2014	2013-2014	2013-2014	2014+ (four-year)
Arkansas	In place	In place	In place	2001	1995-1997 1999-2001 2007-2009 2011-2014	2013-2014	2013-2014	2014+
California	Formal discussions	None	In place (two-year)	1991-2001 (two-year)	None	None	None	None
Colorado	Transitioning	In place	In place	1997-1998 2000-2003	1994-2004 2011-2014	None	1995-1997 2001-2003	1996 1998 (two-year) 1999-2004 2005-2009 (two-year) 2014+ (four-year) 2016+
Connecticut	None	Transitioning	None	1997-2003	None	None	None	None
Delaware	None	None	None	None	None	None	None	None
Florida	Transitioning	In place	In place	1997-2003	1996-2008 2013-2014	None	2014	None
Georgia	Formal discussions	Transitioning	None	None	2006-2008	None	None	None
Hawai'i	None	In place (two-year)	In place	None	2011-2014	None	None	2012-2014+
Idaho	Formal discussions	None	Developing	2001-2003	2000-2005 (unsure)	None	None	None
Illinois	In place	In place	In place (two-year)	1998-2002 (two-year)	1998-2002 2011-2014	None	2013-2014	1999-2002 (two-year) 2014+
Indiana	In place	In place	In place	1998	2007-2014	2004-2014	2007-2014	2008-2014+
Iowa	None	Transitioning	None	None	None	None	None	None
Kansas	None	In place	In place	1999-2003	1999-2008 2013-2014	2006-2009	2006-2014	2005-2014+
Kentucky	Formal discussions	None	In place	1997	1994-1998	1996-1998	1996-1998	1996-1997
Louisiana	In place	In place	In place	1998-2003	2001-2014	2009-2014	2010-2014	2011-2014+

Maine	Formal discussions	In place (four-year)	In place (four-year)	None	2013-2014	None	2014	--
Maryland	Formal discussions	None	None	None	None	None	None	None
Massachusetts	In place	In place	Developing	None	2013-2014	None	None	2014+ (two-year)
Michigan	In place	In place	In place	None	2012-2014	2013-2014	2013-2014	2007+ (two-year) 2014+ (four-year)
Minnesota	In place	In place	Developing	1997	1994-1998 2013-2014	1997	2008-2009 2012-2014	1996-1997 (four-year, most two-year) 2012-2015+
Mississippi	In place (four-year)	In place (four-year)	Developing	None	2013-2014	None	2014	2014+ (four-year)
Missouri	In place	In place	Developing	1997-2002	1993-2002 2013-2014	1994-2001	1994-2002 2014	1995 (two-year) 1996-2002 2014+
Montana	Transitioning	In place	In place	None	2013-2014	None	None	2014+
Nebraska	None	None	None	None	None	None	None	None
Nevada	In place	In place	In place	None	2013-2014	None	None	2014+
New Hampshire	None	None	None	None	None	None	None	None
New Jersey	None	None	None	1999-2002	1999-2003	2000-2002	2000-2002	2000-2003
New Mexico	In place (four-year)	In place	In place	None	2003-2014	2013-2014	2013-2014	2014+
New York	Formal discussions	In place (two-year)	In place (two-year)	1999-2003 (state university system)	1998-2007 (SUNY) 2000-2014 (CUNY)	None	None	--
North Carolina	Transitioning	In place	In place (two-year)	None	1999-2008 2012-2014	None	None	2000-2006 (optional, two-year) 2007-2013 (two-year)
North Dakota	In place	In place	In place	None	2013-2014	None	None	Not listed
Ohio	In place	In place	In place	1997-2003	1995-2014	1998-2014	1998-2014	1998-2009 (four-year, main campuses) 2010 (four-year) 2011-2014+
Oklahoma	In place	In place	Developing	1998-2000 2002-2003	1997-2014	2013-2014	2013-2014	2002-2014+ (four-year)
Oregon	Transitioning	In place (four-year)	In place (four-year)	2001-2003	1999-2000 2007-2014	2012-2014	2009-2014	2000 (four-year) 2009+ (four-year)
Pennsylvania	In place	In place (four-year)	In place (four-year)	2000-2003	2000-2014	2001-2014	2001-2014	2001-2014+ (four-year state system)
Rhode Island	None	None	In place	None	None	None	None	None
South Carolina	Formal discussions	None	None	1997-2003	1996-2002	1998-2002	1998-2002	1998-2003

South Dakota	In place (four-year)	Transitioning	None	1998-2003	1997-2002 2004-2013	1998-2003 2005 2013	2005 2011	None
Tennessee	In place	In place	In place	1997-2003	1979-2014	2012-2014	1993-2014	1993-2001 2006-2011+
Texas	In place (two-year)	In place (two-year)	In place (two-year)	1999-2003	1999-2003 2007-2011 2013-2014	2009-2011	2009-2011	2000 2010-2011 (four-year) 2014+ (two-year)
Utah	In place	In place	In place	None	2013-2014	None	None	2014+
Vermont	None	Transitioning	None	None	None	None	None	None
Virginia	In place	In place	In place	1999	2005-2014	None	2005-2014	2007-2014+
Washington	In place (two-year)	In place (two-year)	In place (two-year)	1997-1998	1997-1999 2007-2014	None	1997-1999	1998-1999 (four-year) 2009-2014+ (two-year)
West Virginia	Formal discussions	None	Developing	None	None	None	None	None
Wisconsin	Formal discussions	In place (technical colleges)	In place	None	2013-2014	None	None	2014+ (two-year)
Wyoming	Transitioning	In place (two-year)	In place (two-year)	None	2012-2014	None	None	None

Notes.

¹ If a state was listed as in place and implementing, we list as in place. We do not list sector for “developing” since it was not always clear what sector was included.

² PBF defined as existing in legislation; sector subject to performance not available every year. Authors distinguish various versions of PBF within states; we present years any PBF legislation was in place.

³ Four-year PBF only.

⁴ PBF defined as funded systems with graduation and degree completion metrics. We report community and technical colleges as “two-year” colleges. + indicates policy was in effect after listed year.

Table 2. Features of quasi-experimental national studies examining impacts of PBF

Authors and year	Focus state(s)	Sector	Years	Policy variable(s)
Boland (2018)	National	Four-year, Historically Black Colleges and Universities	2000-2014	<ul style="list-style-type: none"> • PBF (yes/no) and duration (years since adoption) • PBF 1.0 (2000-2006) and 2.0 (2007-2014)
Favero & Rutherford (2019)	National	Four-year	1993-2013	<ul style="list-style-type: none"> • PBF (yes/no) • PBF 1.0 (bonus funds, yes/no) and 2.0 (base funds, yes/no)
Gándara & Rutherford (2018)	National	Four-year	1993-2014	<ul style="list-style-type: none"> • PBF equity metric (yes/no) and duration • PBF racially minoritized student metric (yes/no) and duration • PBF low-income student metric (yes/no) and duration • PBF racially minoritized and low-income student metrics (yes/no) and duration
Gándara & Rutherford (2020)	National	Four-year	2001-2014	<ul style="list-style-type: none"> • PBF (yes/no, defined as funded based on student success metrics) and duration • PBF 1.0 (yes/no) and 2.0 (yes/no) • PBF with equity metric (yes/no) and PBF without equity metric (yes/no)
Hagood (2019)	National	Four-year	1986-2014	<ul style="list-style-type: none"> • PBF (yes/no, defined as funded)
Hillman & Corral (2017)	National (and state-specific)	Four-year	2005-2015	<ul style="list-style-type: none"> • PBF (yes/no)
Kelchen (2019)	National	Two-year	2004-2014	<ul style="list-style-type: none"> • PBF (yes/no) • PBF with equity metric (yes/no) and PBF without equity metric (yes/no)
Kelchen (2018b)	National	Four-year	2004-2014	<ul style="list-style-type: none"> • PBF (yes/no) • PBF with equity metric (yes/no) and PBF without equity metric (yes/no)
Li & Kennedy (2018)	National	Two-year	1990-2013	<ul style="list-style-type: none"> • PBF (yes/no, defined as approved) • HCM Strategists classifications (yes/no for 4 policy types) and duration
Li (2020)	National	Four-year	2003-2014	<ul style="list-style-type: none"> • PBF STEM metric (yes/no) and duration
Tandberg & Hillman (2014)	National	State-level bachelor's degree production	1990-2010	<ul style="list-style-type: none"> • PBF (yes/no, defined as funded) and duration
Tandberg et al. (2014)	National (and state-specific)	State-level associate's degree production	1990-2010	<ul style="list-style-type: none"> • PBF (yes/no, defined as funded) and duration

Notes. List of studies from Ortagus et al. (2020).

Table 3. States with PBF, FY1997-2020

State	Two-Year Sector	Four-Year Sector
Alabama	2019-2020	
Arizona		2013-2017 (not funded 2015)
Arkansas	1997 (not funded) 2008-2011 (not funded 2009-2011) 2014-2020 (not funded 2014-2018)	1997 (not funded) 2008-2011 (not funded 2009-2011) 2014-2020 (not funded 2014-2018)
California	2017-2020 (not funded 2017-2018)	
Colorado	2001-2004 (not funded 2004) 2016-2020	2001-2004 (not funded 2004) 2016-2020
Connecticut	2017-2020	
Florida	1997-2020 (not funded 2009-2013)	1997-1999 2008 2013-2020
Hawai'i	2010-2020 (not funded 2010-2011)	2017-2020
Illinois	1999-2002 (not funded 2002) 2013-2020 (not funded 2015-2016)	2013-2020 (not funded 2015-2020)
Indiana	2010-2020	2007-2020
Kansas	2006-2020 (not funded 2009-2012, 2016-2017)	2006-2020 (not funded 2010-2012, 2014, 2016-2018)
Kentucky	1997-1998 2018-2020	1997-1998 2018-2020 ¹
Louisiana	2017-2020	2017-2020
Maine		2014-2018 ²
Massachusetts	2014-2018 (not funded 2018)	2016-2018 ³ (not funded 2018)
Michigan	2013-2020	2006-2007 2013-2020
Minnesota	1997-1998 (not funded 1997-1998) 2008-2009 2012-2019	1997-1998 (not funded 1997-1998) 2008-2009 2012-2019 ⁴
Mississippi		2014-2016 (not funded 2015-2016)
Missouri	1997-2002 (not funded 2002) 2014-2020 (not funded 2017-2020)	1997-2002 (not funded 2002) 2014-2020 (not funded 2017-2020)
Montana	2013-2020 (not funded 2013-2014)	2013-2020 (not funded 2013-2014)
Nevada	2014-2020 (not funded 2014)	2014-2020 (not funded 2014)
New Jersey	2000-2002	2000-2002 2020
New Mexico	2013-2020	2013-2020
New York	2014-2018	
North Carolina	1999-2020	
North Dakota	2014-2020	2014-2020
Ohio	1997-1999 2010-2020 (not funded 2010)	1998-2020
Oklahoma	2002-2020 (not funded 2015-2019)	2002-2020 (not funded 2015-2019)
Oregon		2008-2020 (not funded 2011)
Pennsylvania		2001-2019 ⁵
Rhode Island	2018-2020 (not funded 2018)	2018-2020 (not funded 2018)
South Carolina	1998-2002 2014-2020 ⁶	1998-2002

South Dakota		2000-2003 2005-2013 (not funded 2011-2012)
Tennessee ⁷	1997-2020	1997-2020
Texas	2012-2020 (not funded 2012-2013)	2009-2020 (not funded 2012-2020)
Utah	2013-2020 (not funded 2013)	2013-2020 (not funded 2013)
Vermont	2019-2020 (not funded 2019)	2019-2020 (not funded 2019) ⁸
Virginia	2017-2020	
Washington	1998-1999 2010-2020	1998-1999
Wisconsin	2015-2020 ⁹	2019-2020
Wyoming	2011-2020 (not funded 2011-2012)	

Notes.

¹ Excludes Kentucky State University in 2018.

² Excludes Maine Maritime Academy.

³ Excludes Massachusetts College of Liberal Arts, Massachusetts College of Art and Design, and Massachusetts Maritime Academy.

⁴ Minnesota operated PBF for the University of Minnesota system (four-year) and the Minnesota State College and University (MnSCU) system (both sectors). MnSCU institutions only in 2018-2019.

⁵ PASSHE only.

⁶ Technical colleges only.

⁷ Tennessee began operating two systems in 2010.

⁸ Excludes University of Vermont.

⁹ Only Wisconsin Technical College System institutions in 2015-2018.

Table 4. Funded PBF System Performance Metrics, 2020

	Sector	Credit Hour Completion	Progression to Degree	Transfer	Time to Degree	Number of Completions	STEM Degrees	Health Degrees	Labor Market
Alabama	Two-year	Yes	Yes	No	Yes	Yes	No	No	No
Arkansas	Both	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
California	Two-year	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Colorado	Both	No	Yes	Yes	No	Yes	Yes	Yes	No
Connecticut	Two-year	Yes	Yes	No	No	No	No	No	No
Florida	Both	Yes (two-year)	Yes	Yes (two-year)	Yes	Yes (two-year)	Yes	Yes	Yes
Hawai'i	Both	No	No	Yes (two-year)	Yes	Yes	Yes	No	No
Illinois	Two-year	Yes	Yes	Yes	No	Yes	No	No	No
Indiana	Both	No	Yes	No	Yes	Yes	Yes	No	No
Kansas	Both	No	Yes	Yes (two-year)	Yes	Yes	Yes	Yes	Yes (two-year)
Kentucky	Both	Yes	Yes	Yes (two-year)	No	Yes	Yes	Yes	No
Louisiana	Both	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Michigan	Both	Yes (two-year)	No	No	Yes (four-year)	Yes	Yes (four-year)	Yes (four-year)	No
Montana	Both	Yes (two-year)	Yes	No	No	Yes	No	No	No
Nevada	Both	No	No	Yes	No	Yes	Yes	Yes	No
New Jersey	Four-year	No	No	No	No	Yes	No	No	No
New Mexico	Both	Yes	No	No	No	Yes	Yes	Yes	No
North Carolina	Two-year	No	Yes	Yes	No	Yes	No	No	Yes (two-year)
North Dakota	Both	Yes	No	No	No	No	No	No	No
Ohio	Both	Yes	Yes (two-year)	Yes (two-year)	No	Yes	Yes	No	No
Oklahoma	Both	No	Yes	No	Yes	Yes	No	No	No
Oregon	Four-year	Yes	No	Yes	No	Yes	Yes	Yes	No
Rhode Island ¹	Both	No	Yes	Yes	Yes	Yes	Yes	Yes	No
South Carolina	Two-year	No	Yes	No	Yes	No	No	No	Yes

Tennessee	Both	No	Yes	Yes (two-year)	Yes (four-year)	Yes	Yes	Yes	Yes
Texas	Two-year	No	Yes (community colleges)	Yes (community colleges)	No	Yes (community colleges)	Yes (community colleges)	Yes (community colleges)	Yes (technical colleges)
Utah	Both	No	No	No	Yes	Yes	Yes	Yes	No
Vermont	Both	No	No	No	Yes	No	No	No	No
Virginia	Two-year	No	Yes	Yes	No	Yes	Yes	Yes	No
Washington	Two-year	No	Yes	Yes	No	Yes	No	No	No
Wisconsin	Both	Yes (technical colleges)	Yes (four-year)	Yes (four-year)	Yes (four-year)	Yes (four-year)	Yes	Yes	Yes (technical colleges)
Wyoming	Two-year	Yes	No	No	No	Yes	Yes	Yes	No

Notes.

¹ FY2019.

Table 5. Funded PBF System Equity Metrics, 2020

	Sector(s)	Low-income students	Racially minoritized students	Adult students	Acad. underprepared students
Alabama	Two-year	Yes	Yes	Yes	No
Arkansas	Both	Yes	Yes	Yes	Yes
California	Two-year	Yes	No	No	No
Colorado	Both	Yes	Yes	No	No
Connecticut	Two-year	No	No	No	No
Florida	Both	Yes (four-year)	Yes (four-year)	Yes (four-year)	Yes (four-year)
Hawai'i	Both	Yes	Yes	No	No
Indiana	Both	Yes	No	No	No
Illinois	Two-year	Yes	No	Yes	Yes
Kansas	Both	Yes	Yes	Yes	Yes
Kentucky	Both	Yes	Yes	No	Yes (two-year)
Louisiana	Both	Yes	Yes	Yes	No
Michigan	Both	Yes (four-year)	No	No	No
Montana	Both	Yes	Yes	Yes	Yes (four-year)
Nevada	Both	Yes	Yes	Yes	Yes (two-year)
New Jersey	Four-year	Yes	Yes	No	No
New Mexico	Both	Yes	No	No	No
North Carolina	Two-year	No	No	No	Yes
North Dakota	Both	No	No	No	No
Ohio	Both	Yes	Yes	Yes	Yes
Oklahoma	Both	Yes	No	No	No
Oregon	Four-year	Yes	Yes	No	No
Rhode Island	Both	Yes (four-year)	Yes (four-year)	No	No
South Carolina	Two-year	No	No	No	No
Tennessee	Both	Yes	Yes	Yes	Yes
Texas	Two-year	Yes	No	Yes	Yes
Utah	Both	Yes	No	No	No
Vermont	Both	No	No	No	No
Virginia	Two-year	Yes	Yes	No	No
Washington	Two-year	Yes	Yes	No	Yes
Wisconsin	Both	Yes	Yes	Yes (two-year)	No
Wyoming	Two-year	No	No	No	No

Figure 1. PBF States

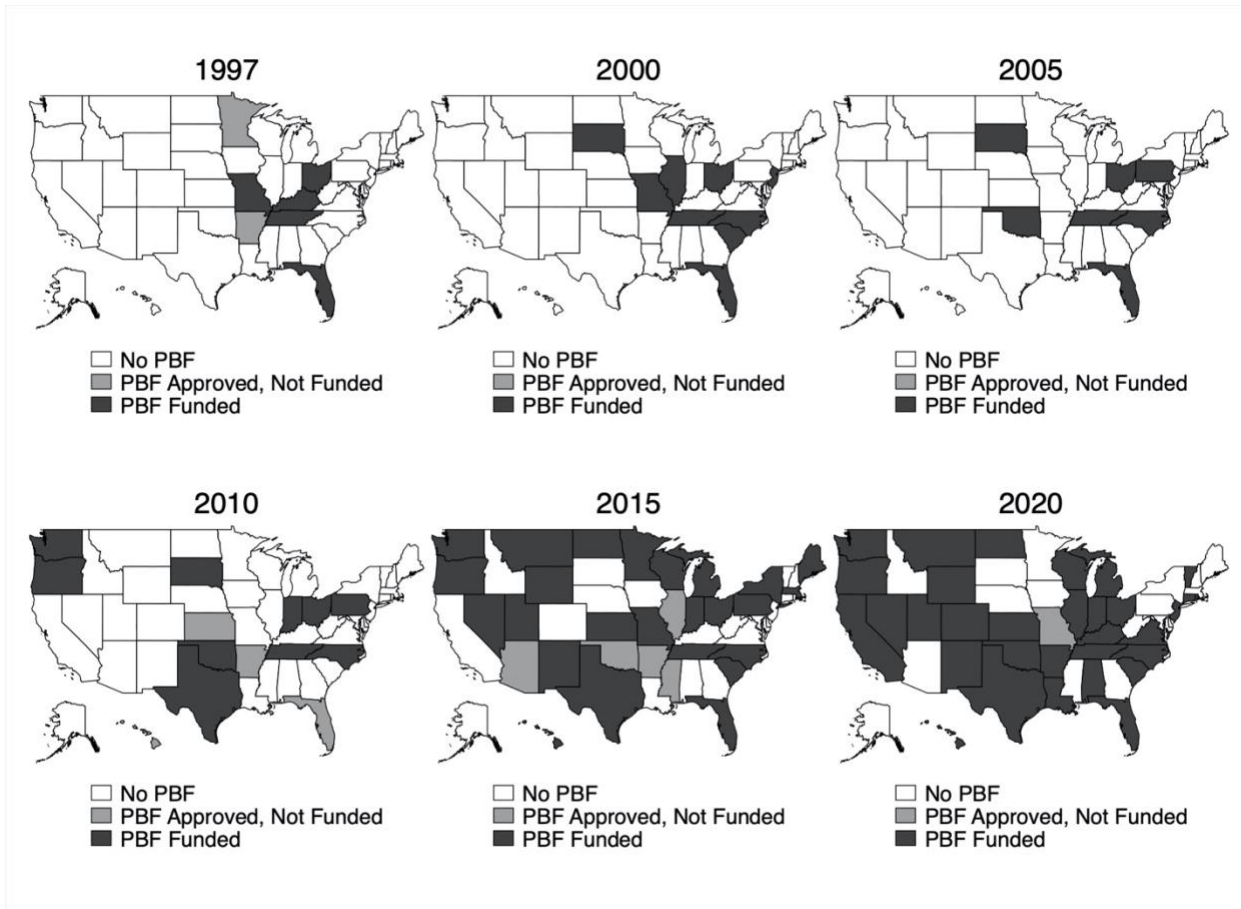
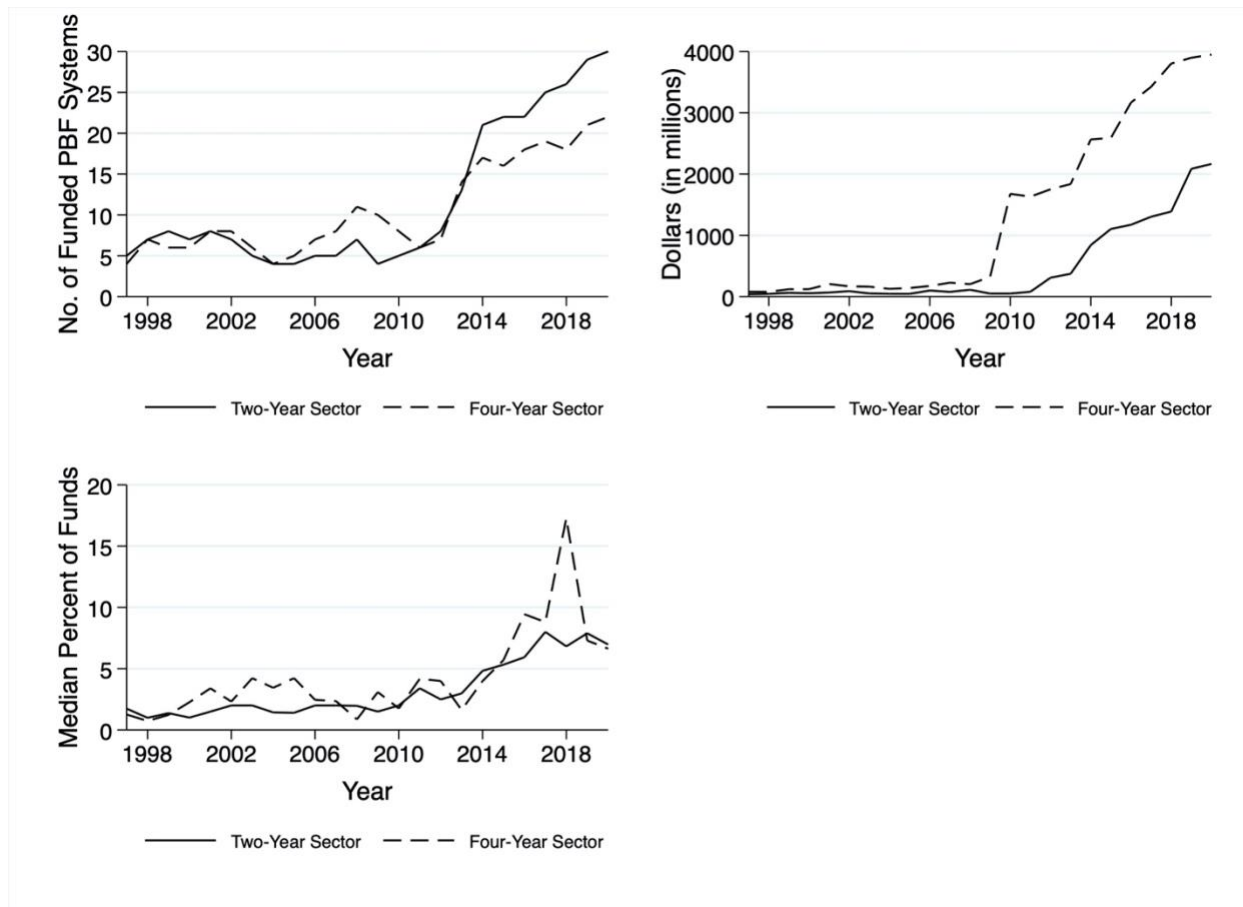


Figure 2: Number of Funded PBF Systems, Total Funding, and Median Percent of Funds Budgeted by Sector, 1997-2020



Notes. Financial figures adjusted to 2020 dollars. The 2018 spike in the median percent of funds at stake in the four-year sector is driven by several states with lower-dosage PBF in 2017 moving away from PBF and several states enacting lower-dosage PBF in 2019.

Figure 3. Percent of Funds at Stake by Quartile in Funded PBF Systems, 2020

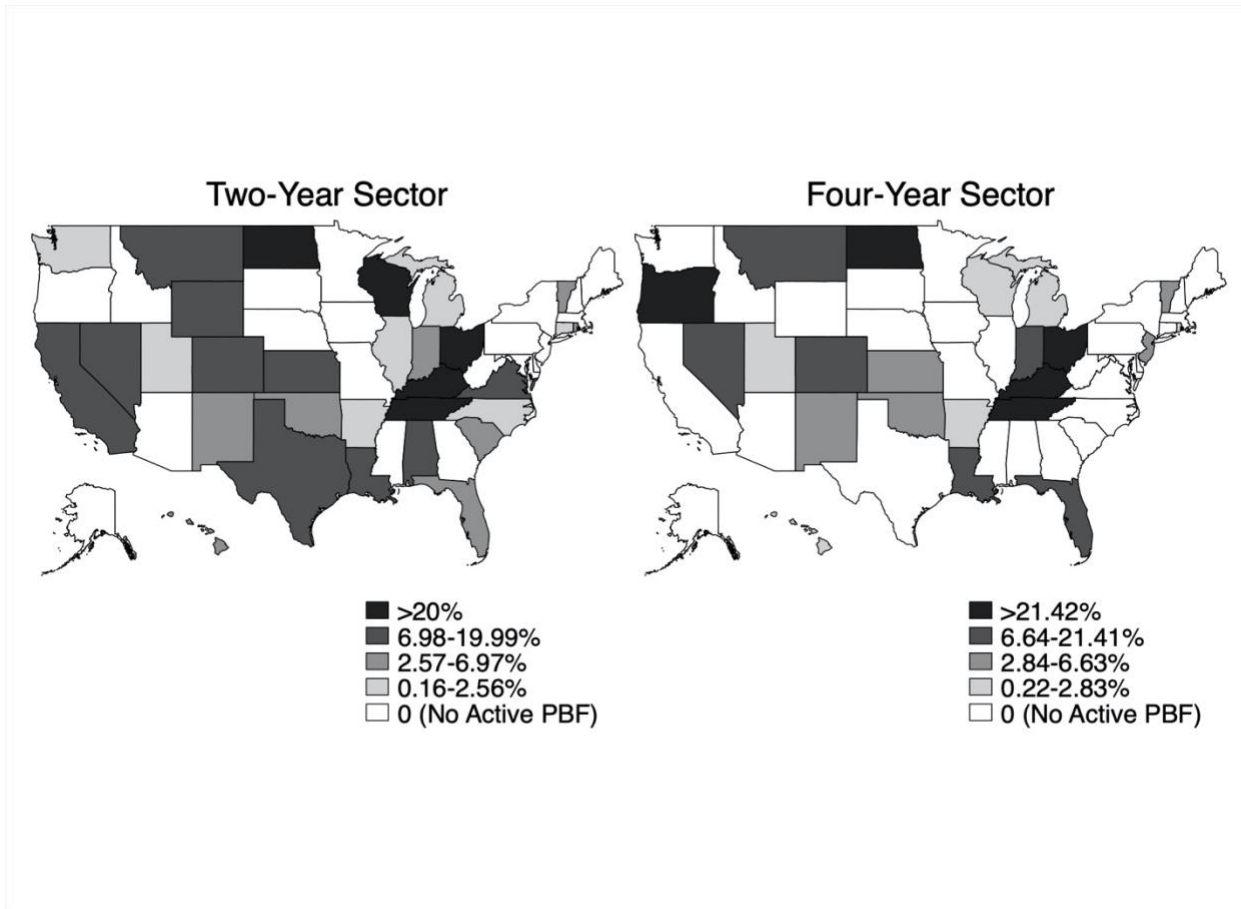
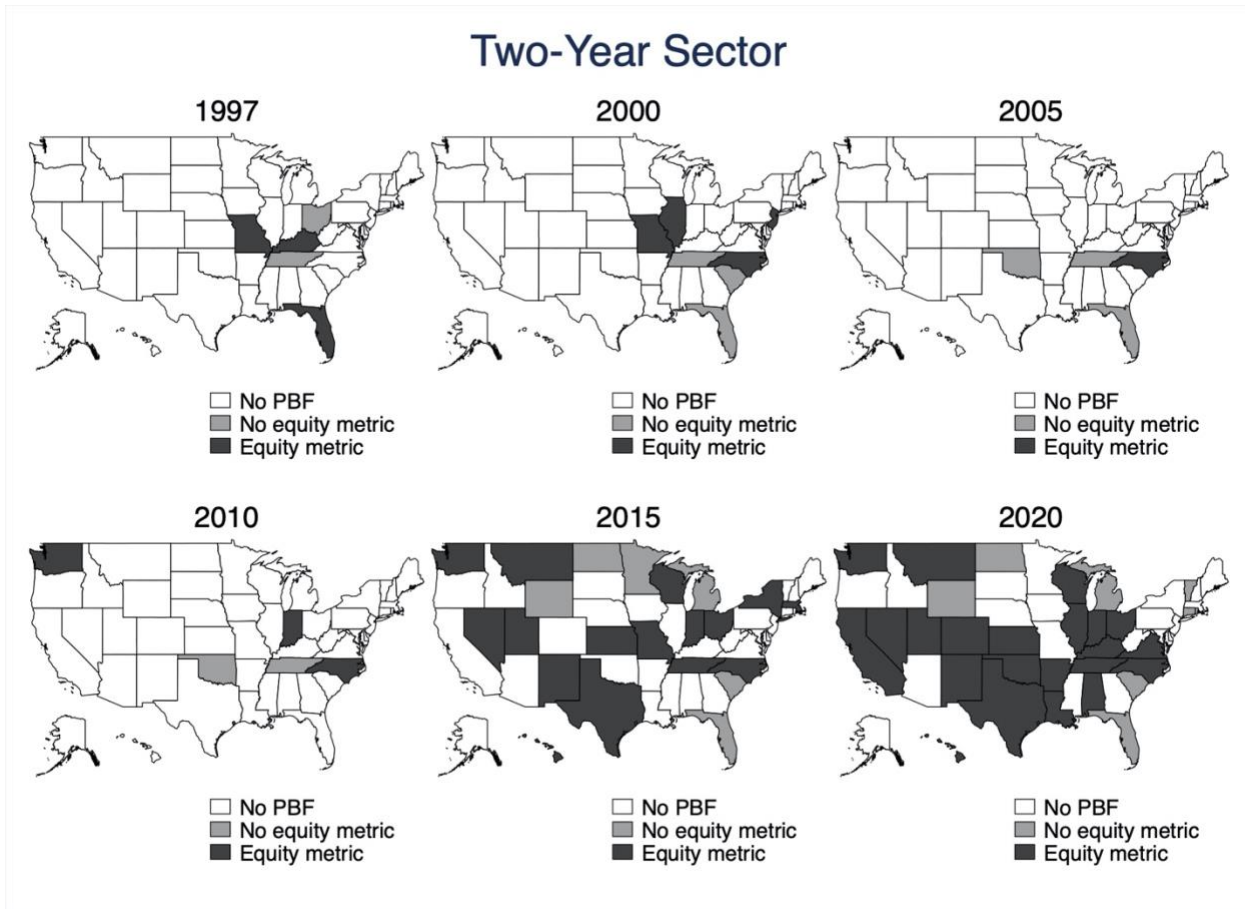
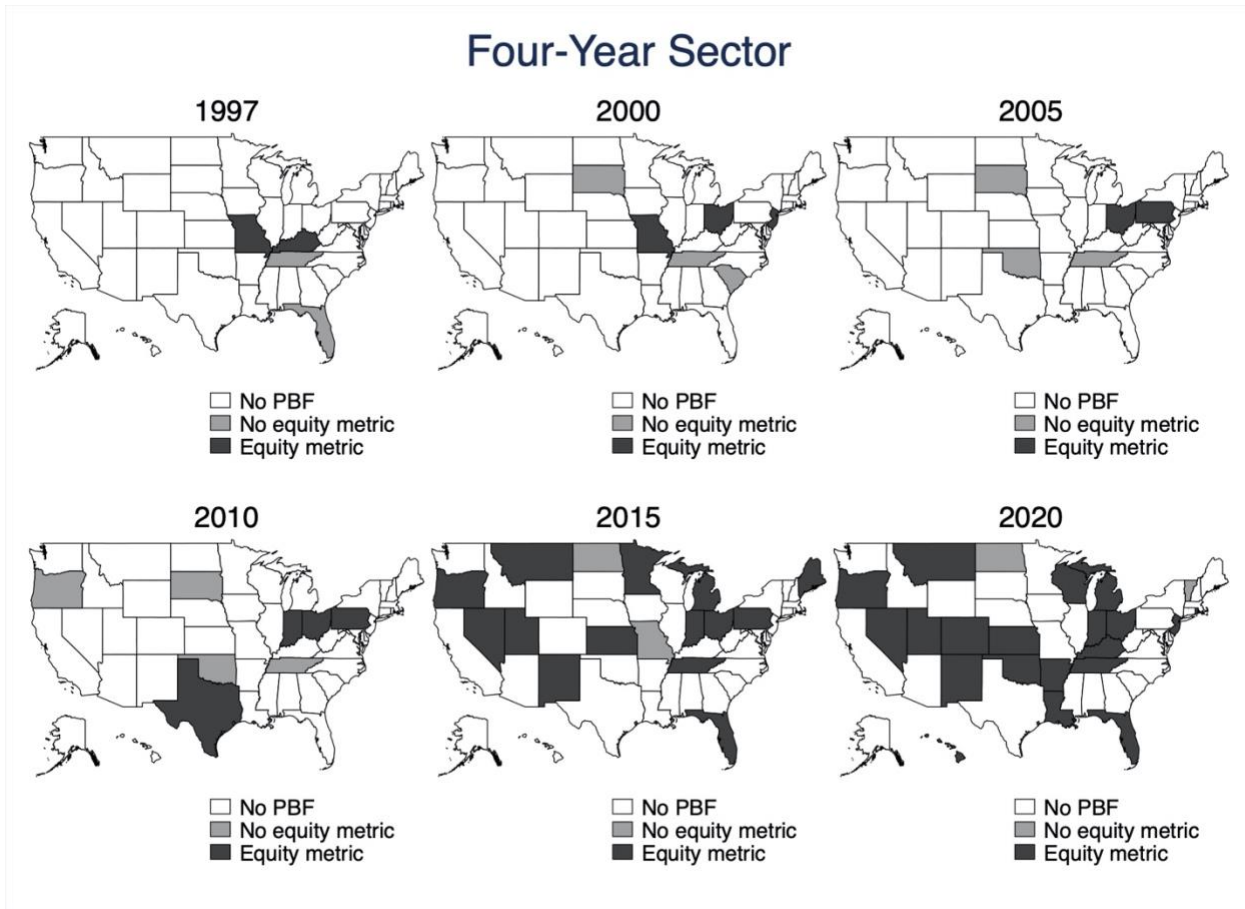


Figure 4. Equity Metrics for Funded Two-Year PBF Systems



Notes. States are coded as having an equity metric if they include a metric for low-income, racially minoritized, adult, and/or academically underprepared students in a given year.

Figure 5. Equity Metrics for Funded Four-Year PBF Systems



Notes. States are coded as having an equity metric if they include a metric for low-income, racially minoritized, adult, and/or academically underprepared students in a given year.