

Research Brief: Measuring the Effects of Outcomes-Based Funding on Certificate Production: Challenges, Inconsistencies and Recommendations for Future Research

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Overview

Outcomes-based funding has become an increasingly common tool for states that seek to improve student outcomes by explicitly linking some portion of their funding for public postsecondary institutions to that goal. As of 2018, twenty-five states have some form of outcomes-based funding (OBF) policy. Of these, twenty-two use OBF in the community college sector, and all but one of these states reward certificate completion.¹

The inclusion of certificates in OBF policies has been subject to considerable scrutiny. Research on the impacts of OBF policies has shown significant increases in short-term certificates.² Many have suggested that the surge in short-term certificates signals an unintended consequence of OBF policies, arguing that institutions in OBF states are being incentivized to steer students toward certificates with relatively lower educational and labor market value rather than toward more time-intensive, and presumably more valuable, degrees.

Yet the picture is considerably more complicated. Certificates vary greatly in length, type, and labor market value. Additionally, states vary greatly in how they define and reward certificate completions in their OBF policies. States also change their OBF policies frequently. Finally, available databases do not adequately capture these variations. When taken together, these factors make it difficult to either determine or generalize about whether and how OBF policies have affected certificate attainment and the economic and social mobility of students.

NOTE: For the purposes of this brief, we utilize HCM Strategists' definition and most recent typology of **Outcomes-Based Funding (OBF)**.³ Broadly speaking, these policies link state appropriations for higher education to the accomplishment of specific student outcomes. OBF is intended to highlight the alignment between the state higher education funding method and the state's higher education attainment and student success goals, in order to incent institutions to support these state priorities.

¹ Snyder, M. & Boelscher, S. (2018). *Driving Better Outcomes: Fiscal Year 2018 State Status & Typology Update*. Retrieved from HCM Strategist <http://hcmstrategists.com/resources/driving-better-outcomes-fiscal-year-2018-state-status-typology-update>

² Hillman, N. W., Tandberg, D. A., and Fryar, A. H., (2015). Evaluating the impacts of "new" performance funding in higher education. *Educational Evaluation and Policy Analysis*, 37(4): 501-519. doi: 10.3102/0162373714560224.; Li, A. Y. & Kennedy, A. I. (2018). Performance funding policy effects on community college outcomes: Are short-term certificates on the rise? *Community College Review*, 46(1), 3-39.; Hillman, N. W., Fryar, A. H., and Crespín-Trujillo, V. (2017). Evaluating the impacts of performance funding in Ohio and Tennessee. *American Educational Research Journal*, 55(1): 1144-170.

³ Snyder, M. (2015). *Driving Better Outcomes: Typology and Principles to Inform Outcomes-Based Funding Models*. Retrieved from HCM Strategist <http://hcmstrategists.com/drivingoutcomes/wp-content/themes/hcm/pdf/Driving%20Outcomes.pdf>

This research brief lays out both the challenges and opportunities inherent in studying the effects of OBF on certificate attainment by:

- I. Summarizing what is known about variation in the type, length, and value of certificates;
- II. Documenting variation in how states currently define and reward certificates in OBF formulas;
- III. Illustrating the limitations of available datasets to capture this variation; and
- IV. Providing a set of recommendations for how the field can better examine the intended and unintended effects of including certificates in OBF policies.

I. Variation in Type, Length, and Value of Certificates

Certificates are the fastest-growing postsecondary credential nationwide. Between 2007-08 and 2016-17, the number of certificates awarded by all degree-granting, public postsecondary institutions alone increased by 58 percent, compared to an increase of 49 percent in associate degrees and a 28 percent increase in bachelor's degrees.^{4,5} As of 2012, one in ten American workers reported a certificate as their highest level of education.⁶

A. Type of Certificates

The 2006 Perkins Act characterizes certificates as either **occupational**, which focus on career-related skills and are aligned to workforce fields (e.g., computer science, education, health care); or **academic**, which are typically decontextualized from the labor market (e.g., humanities, social sciences). In 2016, approximately 87% of certificates were awarded in occupational fields.⁷

B. Length of Certificates

Certificates, both academic and occupational, are also classified by program length or the number of credit hours required for completion. States, institutions, and researchers often refer to certificates that can be completed in less than one year as “short-term,” while certificates that require one to two years are described as “medium-” or “long-term” certificates. However, “long-term” certificates can require as many as two to four years to complete in some states.

Yet within these broad categories, states define certificate length differently. Figure 1 illustrates some of these variations in states that reward certificates in their OBF policies. For example, a short-term certificate in Tennessee is defined as any certificate that can be completed in less than one year and can require anywhere from 1 to 24 credits. In contrast, a short-term certificate in Indiana requires between 18 and 29 credits. This variation in how states define certificate length

⁴ National Center for Education Statistics (2017). Degrees/certificates conferred by postsecondary institutions 1970-71 through 2016-17. Retrieved January 31, 2019 from https://nces.ed.gov/programs/digest/d18/tables/dt18_318.40.asp

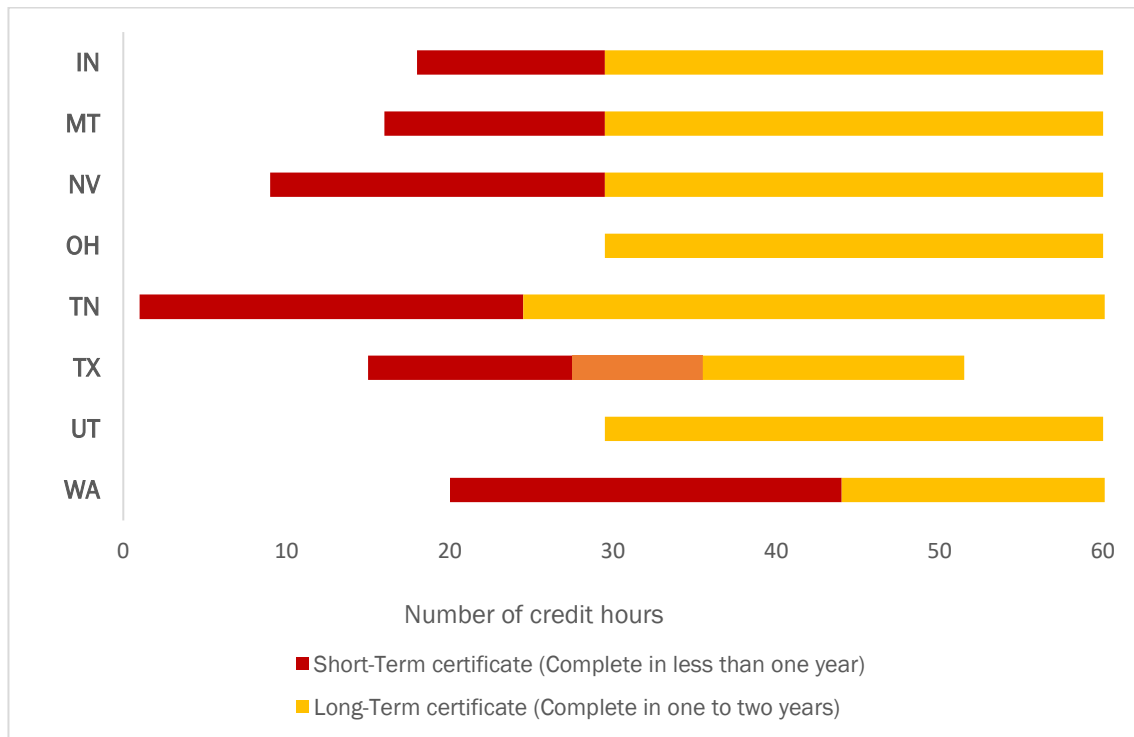
⁵ Miller, A., Erwin, M., Richardson, S., and Arntz, M. Collecting and Disseminating Data on Certificate Awards. (NPEC 2016). U.S. Department of Education. Washington, DC: National Postsecondary Education Cooperative. Retrieved March 15th 2018 from https://nces.ed.gov/ipeds/pdf/NPEC/data/NPEC_Paper_IPEDS_Collecting_and_Disseminating_Certificate_Awards_2016.pdf

⁶ Carnevale, Anthony P., Stephen J. Rose, and Andrew R. Hanson. Certificates: Gateway to Gainful Employment and College Degrees. Georgetown University Center on Education and the Workforce. Washington, D.C. (2012).

⁷ Authors' calculations based on https://nces.ed.gov/programs/digest/d17/tables/dt17_320.10.asp using categorization from https://nces.ed.gov/surveys/ctes/tables/postsec_tax.asp.

has significant implications for those studying the impact of OBF—a topic that is discussed throughout the remainder of this brief.

Figure 1. Variation in how OBF states define short-term and long-term certificates, in credit hours



Notes:

1. Seven states (about a third of states that include certificates in their OBF formulas) specify a minimum number of credit hours required for the certificate to qualify as an outcome metric.
2. Tennessee defines short- and long-term certificates by credit hour requirements, but does not define a credit-hour minimum for short-term certificates.
3. Ohio and Utah do not reward short-term certificates in their OBF formulas.
4. The orange bar indicates an overlap in classification of certificates by credit hours. Texas does not classify certificates as short- and long-, but by levels 1, 2, and advanced. Level 1 certificates require from 15 to 42 credit hours, level 2 certificates require from 30 to 51, and advanced technology certificates require from 30 to 50 credit hours.

C. Value of Certificates

Here we focus specifically on the value of occupational certificates, which constitute the vast majority of certificates awarded throughout the United States each year. Occupational certificates are one of the main pathways into so-called “middle jobs”⁸—those requiring less than a bachelor’s degree that lead to a middle-class wage. The nation has seen a 30 percent increase in these jobs in the last 25 years, in contrast to the 12 percent decline in middle-class wage job opportunities

⁸ Carnevale, A. P., Jayasundera T., and Hanson A.R. (2012). Career and Technical Education: Five Ways That Pay Along the Way to the B.A. Georgetown University Center on Education and the Workforce. Washington, D.C. Retrieved April 8th 2018 from <https://1gyhoq479ufd3yna29x7ubjn-wpengine.netdna-ssl.com/wp-content/uploads/2014/11/CTE.FiveWays.FullReport.pdf>

available to those with only a high school diploma.⁹ On average, as of 2012, certificates holders earn 20% more than high school graduates. Bachelor's degrees remain the best bet for economic opportunity; 56% of "good jobs" are those requiring at least a four year degree.¹⁰ Earnings for certificate-holders in certain fields, however, are comparable to those of workers with associate and bachelor's degrees. For example, male workers with certificates in electronics earn more than 65% of males with associate degrees and 48% of males with bachelor's degrees.¹¹

Certificate recipients' labor market outcomes also vary based on race, gender, length of the certificate, field of study, and whether or not the recipient works in the field of the certificate.¹² The institution granting the certificate matters as well: labor market returns to certificates earned at for-profit institutions tend to be lower than those earned at community colleges.¹³

Some studies have found that long-term certificates have a greater payoff in the labor market than short-term certificates.¹⁴ Yet other research finds that the returns on short- and long-term certificates vary based on gender and field. For example, Bahr et al. found that students earning a long-term certificate earned \$2,500 to \$3,600 more per year than those without a credential, with larger returns concentrated among men. Although women gained little when awarded a short-term certificate, men gained \$5,200 per year, surpassing the returns of a long-term certificate.¹⁵ Several studies have found that returns are highest for both short- and long-term certificates in health-related and technical fields.¹⁶

Determining the earning effects of **stackable credentials** requires additional nuance. Stackable credentials are designed to function as sequential postsecondary completions aligned to a career path. There are three commonly recognized patterns of stacking. Independent stacking refers to the

⁹ Carnevale, A.P., Strohl, J., Ridley N., and Artem G. (2018) Three Educational Pathways to Good Jobs: High School, Middle Skills, and Bachelor's Degree. Georgetown University Center on Education and the Workforce. Washington, D.C. (2018). Retrieved November 30th 2018 from <https://cew.georgetown.edu/publications/reports/>

¹⁰ Ibid.

¹¹ Carnevale, A.P., Rose S. J., and Hanson A.R (2012). Certificates: Gateway to Gainful Employment and College Degrees. Georgetown University Center on Education and the Workforce. Washington, D.C. Retrieved April 8th 2018 from <https://1gyhoq479ufd3yna29x7ubjnwengine.netdna-ssl.com/wp-content/uploads/2014/11/Certificates.FullReport.061812.pdf>;

¹² Carnevale, A.P., Rose S. J., and Hanson A.R (2012). Certificates: Gateway to Gainful Employment and College Degrees. Georgetown University Center on Education and the Workforce. Washington, D.C. Retrieved April 8th 2018 from <https://1gyhoq479ufd3yna29x7ubjnwengine.netdna-ssl.com/wp-content/uploads/2014/11/Certificates.FullReport.061812.pdf>; Bahr, P. R., Dynarski, S., Jacob, B., Kreisman, D., Sosa, A., & Wiederspan, M. (2015). Labor Market Returns to Community College Awards: Evidence from Michigan. A CAPSEE Working Paper. *Center for Analysis of Postsecondary Education and Employment*.; Dadgar, M., & Trimble, M. J. (2015). Labor market returns to sub-baccalaureate credentials: How much does a community college degree or certificate pay?. *Educational Evaluation and Policy Analysis*, 37(4), 399-418.; Jepsen, C., Troske, K., & Coomes, P. (2014). The labor-market returns to community college degrees, diplomas, and certificates. *Journal of Labor Economics*, 32(1), 95-121.; Xu, D., & Trimble, M. (2016). What about certificates? Evidence on the labor market returns to nondegree community college awards in two states. *Educational Evaluation and Policy Analysis*, 38(2), 272-292.; Bailey, T., & Belfield, C. R. (2012). Community college occupational degrees: Are they worth it?. In L. Perna (Ed.), *Preparing today's students for tomorrow's jobs in metropolitan America* (pp. 121-148). Philadelphia, PA: University of Pennsylvania Press.

¹³ Carnevale, Anthony, et al. "Certificates in Oregon – A Model for Workers to Jump Start or Reboot Careers." CEW Georgetown, Center on Education and the Workforce, (2018) cew.georgetown.edu/states/oregon

¹⁴ Dadgar, M., & Trimble, M. J. (2015). Labor market returns to sub-baccalaureate credentials: How much does a community college degree or certificate pay?. *Educational Evaluation and Policy Analysis*, 37(4), 399-418.; Jepsen, C., Troske, K., & Coomes, P. (2014).

¹⁵ Bahr, P. R., Dynarski, S., Jacob, B., Kreisman, D., Sosa, A., & Wiederspan, M. (2015). Labor Market Returns to Community College Awards: Evidence from Michigan. A CAPSEE Working Paper. *Center for Analysis of Postsecondary Education and Employment*.

¹⁶ Bahr, P. R., Dynarski, S., Jacob, B., Kreisman, D., Sosa, A., & Wiederspan, M. (2015). Labor Market Returns to Community College Awards: Evidence from Michigan. A CAPSEE Working Paper. *Center for Analysis of Postsecondary Education and Employment*.; Carnevale, A.P., Strohl, J., Ridley N., and Artem G. (2018) Three Educational Pathways to Good Jobs: High School, Middle Skills, and Bachelor's Degree. Georgetown University Center on Education and the Workforce. Washington, D.C. (2018). Retrieved November 30th 2018 from <https://cew.georgetown.edu/publications/reports/>

accumulation of short-term credentials over time. Progression stacking is a system of short-term credentials articulated to a higher degree or credential. Supplemental stacking occurs when a student supplements a degree with a short-term credential.

While the field recognizes the potential of progression stacking to improve completion and provide labor market advantages, existing research provides little evidence of impact. One study found that progression stacking motivated students to complete short-term certificates and pursue additional credentials but observed racial disparities and limited labor market gains.¹⁷ Notably, scholars point to data limitations as obstacles to measuring the impact of stacked credentials. Specifically, both institutional and state data systems track the completion of discrete credentials but do not indicate which credentials, if any, have been stacked.¹⁸

Taken as a whole, the considerable variation in type, length, and labor market value of postsecondary certificates makes it difficult to accurately generalize about the value and efficacy of certificates and their role in a college completion agenda.¹⁹ Policymakers and researchers alike continue to debate their utility, but these debates are most useful when they include a recognition of the wide variation in these credentials.

II. Documenting Variation in How States Include and Define Certificates in OBF Policy

Twenty-one states with OBF policies currently reward community colleges for the completion of at least some type of certificate. While the literature offers mixed findings on the impact of OBF on bachelor's and associate degrees,²⁰ there is general consensus that OBF incentivizes institutions to produce more certificates—particularly short-term certificates.²¹ This finding is framed as an unintended negative effect for several reasons. First, short-term certificates are generally presumed to be of universally lower value in the labor market. Second, while the proliferation of short-term certificates may help states achieve completion goals, some intuit that the presence of certificates in OBF policies motivates institutions to divert students toward certificates and away from degrees, which can disproportionately and negatively affect underserved students.²² Additionally, some

¹⁷ Giani, M., & Fox, H. L. (2017). Do stackable credentials reinforce stratification or promote upward mobility? An analysis of health professions pathways reform in a community college consortium. *Journal of Vocational Education & Training*, 69(1), 100-122.; Bailey, T., & Belfield, C. R. (2017). Stackable Credentials: Do They Have Labor Market Value? CCRC Working Paper No. 97. *Community College Research Center, Teachers College, Columbia University*.

¹⁸ Bailey, Thomas R., and Clive Belfield. "Stackable Credentials: Awards for the Future?" (2017). *New York: Community College Research Center*.

¹⁹ Fain, P. (2012, June 6). *Not just degrees*. Retrieved from <https://www.insidehighered.com/news/2012/06/06/certificates-are-misunderstood-credentials-pay-mostly-men>

²⁰ Tandberg, D.A., & Hillman, N.W. (2014). State Higher Education Performance Funding: Data, outcomes and policy implications. *Journal of Education Finance*, 39(3), 222-243. <http://muse.jhu.edu/article/539805>; Tandberg, D. A., Hillman, N., & Barakat, M. (2014). State Higher Education Performance Funding for Community Colleges: Diverse Effects and Policy Implications. *Teachers College Record*, 116(12).

²¹ Hillman, N. W., Tandberg, D. A., and Fryar, A. H., (2015). Evaluating the impacts of "new" performance funding in higher education. *Educational Evaluation and Policy Analysis*, 37(4): 501-519. doi: 10.3102/0162373714560224.; Li, A. Y. & Kennedy, A. I. (2018). Performance funding policy effects on community college outcomes: Are short-term certificates on the rise? *Community College Review*, 46(1), 3-39.; Hillman, N. W., Fryar, A. H., and Crespín-Trujillo, V. (2017). Evaluating the impacts of performance funding in Ohio and Tennessee. *American Educational Research Journal*, 55(1): 1144-170.

²² Hillman, N. W., Tandberg, D. A., and Fryar, A. H., (2015). Evaluating the impacts of "new" performance funding in higher education. *Educational Evaluation and Policy Analysis*, 37(4): 501-519. doi: 10.3102/0162373714560224.

researchers suggest that institutions are creating certificates of little value in order to be rewarded for them under their state formulas.

Yet discerning the relationship between OBF, certificate production, and students' long-term outcomes (i.e., educational attainment and living wage employment) is more complicated. Not only do certificates vary along a number of dimensions as noted above; but state OBF policies also vary in terms of which certificates are rewarded and under what conditions.

This variation in how states define the certificates rewarded under their formulas has not been captured in the preeminent literature on OBF.²³ Typically, OBF policies are categorized as either rewarding certificates or not. Yet because certificates vary so much in terms of length, type, and labor market value, analysis that does not consider *which* certificates are being rewarded through OBF may be over-generalizing about the effects of OBF on certification production. In addition, because existing research does not account for differences in *how* OBF policies reward certificates, it cannot accurately inform the field about whether including certificates in OBF policy is an effective strategy for increasing educational attainment and living-wage employment. Nor can it distinguish which certificate-rewarding strategies are most effective in either increasing credential attainment or improving the quality of the workforce.

It is also important to recognize that states frequently make changes to their formulas. While formal review of state formulas is often aligned to legislative sessions, informal changes to formulas can happen more frequently.^{24,25} For example, New Mexico changed its funding formula annually for the first five years of implementation.²⁶ These changes can in some cases have substantial impacts on the ways in which certificates are treated.

Below, we provide a two-step process for accurately determining whether and how states include certificates in their OBF policies.

Step 1. Determine which states have OBF policies and whether policies include certificates

It can be difficult to accurately determine which states have OBF at specific points in time and, if so, what type. This exercise becomes more complicated when examining the effect of OBF on certificate production, given the variability in certificates documented above. Additionally, there is a third layer of complexity: the variation in how states define and categorize certificates in OBF policy.

Table 1 provides a 50-state analysis indicating which states have OBF in place, which OBF policies reward certificates, and, where applicable, which types of certificates are rewarded. To construct

²³ Hillman, N. W., Tandberg, D. A., and Fryar, A. H., (2015). Evaluating the impacts of "new" performance funding in higher education. *Educational Evaluation and Policy Analysis*, 37(4): 501-519. doi: 10.3102/0162373714560224.; Li, A. Y. & Kennedy, A. I. (2018). Performance funding policy effects on community college outcomes: Are short-term certificates on the rise? *Community College Review*, 46(1), 3-39.; Hillman, N. W., Fryar, A. H., and Crespín-Trujillo, V. (2017). Evaluating the impacts of performance funding in Ohio and Tennessee. *American Educational Research Journal*, 55(1): 1144-170.

²⁴ Snyder, M. & Boelscher, S. (2018). Driving Better Outcomes: Fiscal Year 2018 State Status & Typology Update. Retrieved from HCM Strategists <http://hcmstrategists.com/resources/driving-better-outcomes-fiscal-year-2018-state-status-typology-update>

²⁵ Research for Action. (2018). Outcomes-based Funding Equity Toolkit. Retrieved from Research for Action <https://www.obfequitytoolkit.org/>

²⁶ Ibid.

this table we reviewed information on the types of certificates rewarded in OBF policies in publicly available policy documents, OBF formula definitions, and legislative documents (See Appendix A). In cases of discrepancy or ambiguity, we consulted state policymakers for verification.

Table 1. 50-state overview of outcomes-based funding (OBF) policies: OBF policies that include two-year sector institutions, reward certificates, and reward specific types of certificates as of FY2018

State	OBF ²⁷ as of FY2018	OBF in two-year sector	In Two-Year Sector				
			OBF rewards certificate completion	OBF rewards short-term certificates only	OBF rewards long-term certificates only	OBF explicitly rewards both short-term and long-term certificates	OBF does not specify types of certificates rewarded
AL							
AK							
AZ							
AR	•	•	•			•	
CA							
CO	•	•	•			•	
CT							
DE							
FL	•	•	•				•
GA							
HI	•	•	•				•
ID							
IL	•	•	•				•
IN	•	•	•			•	
IA							
KS							
KY	•	•	•				•
LA	•	•	•				•
ME	•						
MD							
MA							
MI	•	•	•				•
MN							
MO							
MT	•	•	•			•	

²⁷ Snyder, M. & Boelscher, S. (2018). Driving Better Outcomes: Fiscal Year 2018 State Status & Typology Update. Retrieved from HCM Strategists <http://hcmstrategists.com/resources/driving-better-outcomes-fiscal-year-2018-state-status-typology-update>

State	OBF ²⁷ as of FY2018	OBF in two-year sector	In Two-Year Sector				
			OBF rewards certificate completion	OBF rewards short-term certificates only	OBF rewards long-term certificates only	OBF explicitly rewards both short-term and long-term certificates	OBF does not specify types of certificates rewarded
NE							
NV	•	•	•			•	
NH							
NJ							
NM	•	•	•			•	
NY	•	•	•				•
NC	•	•	•				•
ND	•	•					
OH	•	•	•		•		
OK							
OR	•						
PA	•						
RI							
SC							
SD							
TN	•	•	•			•	
TX	•	•	•			•	
UT	•	•	•		•		
VT							
VA	•	•	•				•
WA	•	•	•			•	
WV							
WI	•	•	•				•
TOTAL	25	22	21	0	2	9	10

Notably, of the 21 states that reward institutions for certificate completion via OBF policies:

- No state exclusively rewards short-term certificates;
- Two states reward only long-term certificates;
- Nine states explicitly reward some type of both short- and long-term certificates; and
- Ten have adopted OBF policies that reward certificates but do not specify which types of certificates are rewarded.

Step 2. Identify how states reward certificates in OBF policy

When states do reward institutions for certificate completion in OBF policy, their approaches to doing so vary considerably. We reviewed documentation from state websites and media outlets in 2018 for each of the 21 states that currently reward some type of certificate in their two-year OBF policies. To confirm our characterization of how certificates were rewarded under state OBF policies, we triangulated the collected documentation with data reports and consulted with state policymakers in cases where there were discrepancies or ambiguity in the policy documentation.

Table 2 summarizes the conditions under which certificates are rewarded in these policies.

Table 2. Criteria for rewarding certificates in outcomes-based funding (OBF) policies: Limiting and incentivizing factors across 21 state policies in 2018

STATES	LIMITING FACTORS				INCENTIVING FACTORS	
	WEIGHTED LESS THAN DEGREES	MINIMUM CREDIT HOUR REQUIREMENT	HIGH-DEMAND FIELDS ONLY	LIMITS NUMBER REWARDED	BONUS FOR FOCUS POPULATION ^a	BONUS FOR HIGH-DEMAND FIELD ^b
AR	•				•	•
CO	•		• ^c	• ^d	•	•
FL			• ^e		•	
HI					•	•
IL					•	
IN		•			•	
KY					•	•
LA	•				•	•
MI						
MT	• ^f	•	• ^g		•	
NV	•	•	• ^h		•	•
NM			• ⁱ	•	•	•
NY ^j					•	
NC				• ^k		
OH		•		• ^l	•	
TN	•		• ^m		•	
TX		•		•	•	•

STATES	LIMITING FACTORS				INCENTIVING FACTORS	
	WEIGHTED LESS THAN DEGREES	MINIMUM CREDIT HOUR REQUIREMENT	HIGH-DEMAND FIELDS ONLY	LIMITS NUMBER REWARDED	BONUS FOR FOCUS POPULATION ^a	BONUS FOR HIGH-DEMAND FIELD ^b
UT	•	•			•	•
VA	•			•	•	
WA		•		• ⁿ	•	
WI			•		•	
TOTAL	8	7	7	7	19	9

Notes:

- States in this category reward all certificates meeting their minimum credit hour requirements, but the way *bonuses* are applied varies: we include states which reward bonus points for each certificate, states that set bonus weights for focus population, and states that include focus population metrics in their OBF formula. Focus populations are student groups that states identify as priority subgroups, e.g., low-income students, underprepared students, or underrepresented minorities.
- States in this category reward all certificates meeting the minimum requirements and apply *bonuses* to certificates in certain high-demand fields. In contrast, states identified in the fifth column only reward certificates in the fields identified by the state.
- Colorado only rewards short-term certificates (those that require less than a year to complete; typically 24 credit hours) that meet the federal “gainful employment” definition.
- Colorado’s formula only rewards one short-term certificate (those that require less than a year to complete; typically 24 credit hours) within the reporting period, but does not limit the number of longer-term certificates or degrees rewarded under the formula.
- Florida’s formula only rewards certain categories of certificates, e.g., Career and Technical Certificate, Advanced Technical Certificate. See details here: https://www.floridacollegesystem.com/sites/www/Uploads/CompletionRate_1718_Model.pdf.
- Montana applies weights on credentials by institutional mission; completions across metrics are weighted at 30% at flagship institutions, 40% at four-year regionals, and 30% at two-year colleges.
- Montana only includes one-to-two-year certificates that are recognized as Certificates of Applied Science and less-than-one-year certificates that are Certificates of Technical Studies in their OBF formula in the Montana University System.
- Nevada rewards all one-to-two-year certificates that require 30 or more credit hours and awards bonuses to all certificates in STEMH fields, but only rewards less-than-one-year certificates that prepare students to take state-, national-, and/or industry-recognized certification or licensing examinations.
- New Mexico only rewards less-than-one-year certificates in STEMH fields, but one-to-two-year certificates are rewarded regardless of field.
- New York’s formula only applies to SUNY and CUNY systems. No information on limiting factors is publicly available.
- North Carolina rewards one point to each student who earns a credential at any level, including a diploma, certificate, or associate degree. Multiple credentials earned will only be counted as one toward the metric of curriculum completion. See details here: https://www.nccommunitycolleges.edu/sites/default/files/data-warehouse/2018_performance_measures_report_071118_final_1.pdf#overlay-context=analytics/state-and-federal-performance-measures (p.12).
- Ohio’s policy will reward more than one credential in an academic year, but while the first is counted at 100 percent, subsequent credentials are rewarded at 50 percent.
- Tennessee rewards only less-than-one-year certificates that are defined as technical certificates.
- Washington only rewards one point for completion per student every academic year. See details here: <https://www.sbctc.edu/resources/documents/about/agency/initiatives-projects/sai-3-0-criteria-and-documentation-5-16-18.pdf>.

The six columns in Table 2 fall into two categories. The first four columns are ways in which states are limiting the number of certificates rewarded under OBF and include:

- **Weighted Less Than Degrees:** Eight states reward certificates, but weight (i.e., reward) them less than degrees. Certificate weights vary from .1 to .67.
- **Credit Hour Minimum:** In seven states, certificates must meet a credit hour minimum to be rewarded under OBF. Typically, a less-than-one-year certificate requires a credit hour

minimum between 15 and 29 credit hours, while a one-to-two-year certificate requires minimums between 20 and 30 credit hours.

- **High-Demand Fields Only**: Seven states reward specific prioritized fields, usually in STEM and Health, that are aligned with state workforce development priorities. Only certificates earned in these state-defined high-demand fields are counted in the formula.
- **Limitations on Number of Certificates Rewarded**: Seven states limit the number of certificates rewarded by their formula if students earn more than one credential in that reporting period. Typically, if students earn multiple certificates, states in this category only reward one certificate. If a student earns a certificate and an associate degree in the same reporting period, the certificate would not be rewarded or would be discounted.

The last two columns describe conditions that may provide an incentive for institutions to produce certificates:

- **Bonus for Focus Population**: Nineteen states award a bonus (i.e., extra weight or premium) when a certificate is earned by a student from a focus population, such as low-income students.
- **Bonus for High-Demand Fields**: Nine states provide a bonus when institutions award eligible certificates in high-demand fields, such as STEM. Typically, high-demand fields are aligned with state workforce needs. Certificates earned in high-demand fields in these states are rewarded with either more weight or as a separate outcome than other certificates in OBF formulas.

Specific notable patterns seen in Table 2 include the following:

States vary substantially in the number of criteria placed on certificates rewarded by their OBF formulas, and in some cases have criteria that both limit and incentivize certificate production. While states such as Hawaii, Illinois, Kentucky, Michigan, and New York place no restrictions on certificates in their outcomes-based funding policies, other states have a mix of conditions that in some cases restrict and in other cases incentivize certificates under the formula. For example, Nevada and Utah weight certificates less than degrees and require a minimum number of credit hours. But they also provide bonuses for certificates in high-demand fields and for those earned by students in focus populations.

Eight states weight certificates less than degrees, while the remaining 13 states reward certificates and degrees equally. For example, Arkansas weights certificates so that they are rewarded at half the rate of degrees, while Colorado weights certificates so that they are rewarded at a quarter the rate of degrees. In contrast, degrees and certificates both count equally as completions in 13 state formulas.

Seven states include minimum credit hour requirements for certificates to be rewarded in the formula. Ohio and Utah only reward certificates of 30 credits or more. For Indiana, the minimum is 18 credits; for Montana, 16, for Nevada, 9, for Texas, 15, and for Washington, 20.

Seven states only reward certificates in specific fields of study identified by the state higher education authority. Florida only rewards certificates earned from advanced technical programs or certain career and technical programs based on economic development priorities. New Mexico, Nevada, and Tennessee reward all long-term certificates but require that short-term certificates be either in a STEM or healthcare field, or in a state-recognized technical field, to count under the

formula. Colorado only rewards certificates of less than one year that meet the federal “gainful employment” definition. Montana only rewards Certificates of Applied Science or Certificates of Technical Studies. Wisconsin only rewards certificates that correspond to one of the state’s most in-demand occupations.

Seven states do not fully reward multiple certificates earned in the same reporting year. For example, in New Mexico, Texas, and Virginia, if a student earns a certificate and an associate degree in the same year, only the associate degree is rewarded by the OBF formula. In six out of the seven states, if a student earns two certificates in the same year, only one of the two is rewarded. Ohio is an exception; if a student earns two certificates in the same year both count, but the second certificate is discounted by 50 percent.

Nearly all states (19 out of 21) award bonuses for certificates awarded to underserved or focus populations. Focus populations can include low-income students, underprepared students, students of color, adults, and veterans. Only North Carolina and Michigan do not reward institutions with additional funding for the successful attainment of a certificate by students from focus populations.

Nine of 21 states award bonuses for certificates in a high-demand field. High-demand fields are typically defined as STEM fields and health care. States award bonuses for these certificates in different ways: some apply a bonus point for each certificate earned in high-demand field, some include a metric for high-demand field certificate production in their formulas, while others use bonus weights on these certificates to reflect the value of high-demand industries.

The considerable variation detailed in Tables 1 and 2 does not support the argument that any inclusion of certificates in OBF policies incentivizes the production of short-term certificates at the expense of other credentials. While this may well be true in some states, a close examination of the variation in certificates, and in OBF policies themselves, paints a far more complex picture.

III. Determining the Degree to Which Data Sources Accurately Capture State Variation in Certificates Rewarded under OBF Policies

Existing research on the impact of OBF on certificate production relies heavily, if not exclusively, on data available in the Integrated Postsecondary Education Data System (IPEDS). However, IPEDS does not collect data on several key characteristics of postsecondary certificates or OBF policy elements such as whether a certificate is the highest credential earned in an academic year, minimum credit hour requirements for certificates, or student characteristics such as residency status, age, and socioeconomic status. These limitations hamper the capacity of researchers who use IPEDS to conduct analyses that accurately capture variation in the impact of OBF on certificate production and their value.

In contrast, statewide longitudinal data systems often include more nuanced information about certificates and the students receiving them, as well as specific OBF policy elements. Yet these administrative datasets also present limitations for rigorous research, particularly with regard to variation in quality and consistency across states. The strengths and limitations of each dataset for

studying the effects of OBF on certificate production are described below. Additionally, we describe how workforce data may strengthen research on certificate production.

A. The Integrated Postsecondary Education Data System (IPEDS)

IPEDS is a system of surveys conducted annually by the National Center for Education Statistics (NCES). IPEDS is the most commonly used data source for measuring the impact of OBF. As of December 2018, eight peer-reviewed journal articles include analyses of the impact of OBF policies on certificate and degree production in community or technical colleges. Of these, seven utilize IPEDS as their primary data source. In addition, the two articles that specifically examine certificate production in OBF states both use IPEDS.²⁸ IPEDS includes longitudinal data, collected annually since 1980, from all postsecondary institutions (i.e., colleges, universities, technical and vocational institutions) that participate in federal student financial aid programs.

Benefits of Using IPEDS to Examine Certificates in OBF

- **The comprehensive coverage** of U.S. postsecondary institutions allows for comparative analyses at multiple levels, including state, sector, and institution levels.
- **Longitudinal data collection enables long-term trend comparisons** for a range of institutional characteristics and outcomes that have not experienced significant reporting changes over time.
- **The inclusion of total number of certificates awarded by major fields and selected student populations allows** for some tracking of changes in certificate production in OBF states and comparison of certificate production among OBF and non-OBF states.
- Because **IPEDS is publicly available and comprehensively documented** it is widely used and analyses can be replicated if researchers fully display their sampling and methods.

Limitations of Using IPEDS to Examine the Impact of OBF on Certificate Production²⁹

IPEDS has several significant weaknesses that limit its utility for examining the impact of rewarding certificate completion in OBF policies. Most notably, IPEDS surveys require institutions to report on a common set of metrics that do not capture the variations in certificates themselves, in how states

²⁸ Tandberg, D. A., Hillman, N., & Barakat, M. (2014). State Higher Education Performance Funding for Community Colleges: Diverse Effects and Policy Implications. *Teachers College Record*, 116(12), n12.; Hillman, N. W., Tandberg, D. A., and Fryar, A. H., (2015). Evaluating the impacts of “new” performance funding in higher education. *Educational Evaluation and Policy Analysis*, 37(4): 501-519. doi: 10.3102/0162373714560224.; Kelchen, R. & Stedrak, L. J. (2016). Does Performance-Based Funding Affect Colleges’ Financial Priorities?. *Journal of Education Finance*, 41(3), 302-321.; Hillman, N. W., Fryar, A. H., and Crespín-Trujillo, V. (2017). Evaluating the impacts of performance funding in Ohio and Tennessee. *American Educational Research Journal*, 55(1): 1144-170.; McKinney, L., & Hagedorn, L. S. (2017). Performance-based funding for community colleges: Are colleges disadvantaged by serving the most disadvantaged students?. *The Journal of Higher Education*, 88(2), 159-182.; Hu, X., & Villarreal, P. (2018). Public tuition on the rise: Estimating the effects of Louisiana’s performance-based funding policy on institutional tuition levels. *Research in Higher Education*, 1-34.; Li, A. Y., Gandara, D., & Assalone, A. (2018). Equity or disparity: Do performance funding policies disadvantage 2-year minority-serving institutions? *Community College Review*, 46(3), 288-315.; Li, A. Y. & Kennedy, A. I. (2018). Performance funding policy effects on community college outcomes: Are short-term certificates on the rise? *Community College Review*, 46(1), 3-39; Li, Amy Y., Kennedy, Alec I., & Sebastian, Margaret L. (2018). *Policy Design Matters: The Impact of Performance Funding Policies on Credential Completion at Community Colleges* (WISCAPE POLICY BRIEF). Madison, WI: University of Wisconsin–Madison, Wisconsin Center for the Advancement of Postsecondary Education (WISCAPE).

²⁹ The IPEDS surveys we use for this analysis include Institution Characteristics and Completions. We refer to the combined dataset of these two surveys as ‘IPEDS data’ in this brief.

define them, or in how they reward them under OBF. Specific areas of this disconnect are as follows:

IPEDS classifications of short and long-term certificates do not align with OBF policy classifications. As noted in Table 2, seven of 21 OBF states that reward certificates set credit hour minimums for certificates to be eligible for funding through the formula. However, IPEDS does not specify a credit hour minimum for institutions when reporting certificates for the “less than one academic year” category.

Table 3 lists how IPEDS instructs institutions to report different categories of certificates. According to IPEDS, certificates classified as short-term, or “less than one year,” include a wide range of certificates, from those requiring as few as 3 credits to certificates requiring 29 credits (NPEC, 2012). Additionally, IPEDS makes it optional for institutions to report certificates earned with fewer than 12 credits that are approved at the institution or regional level, but many do report these data in their IPEDS surveys.³⁰

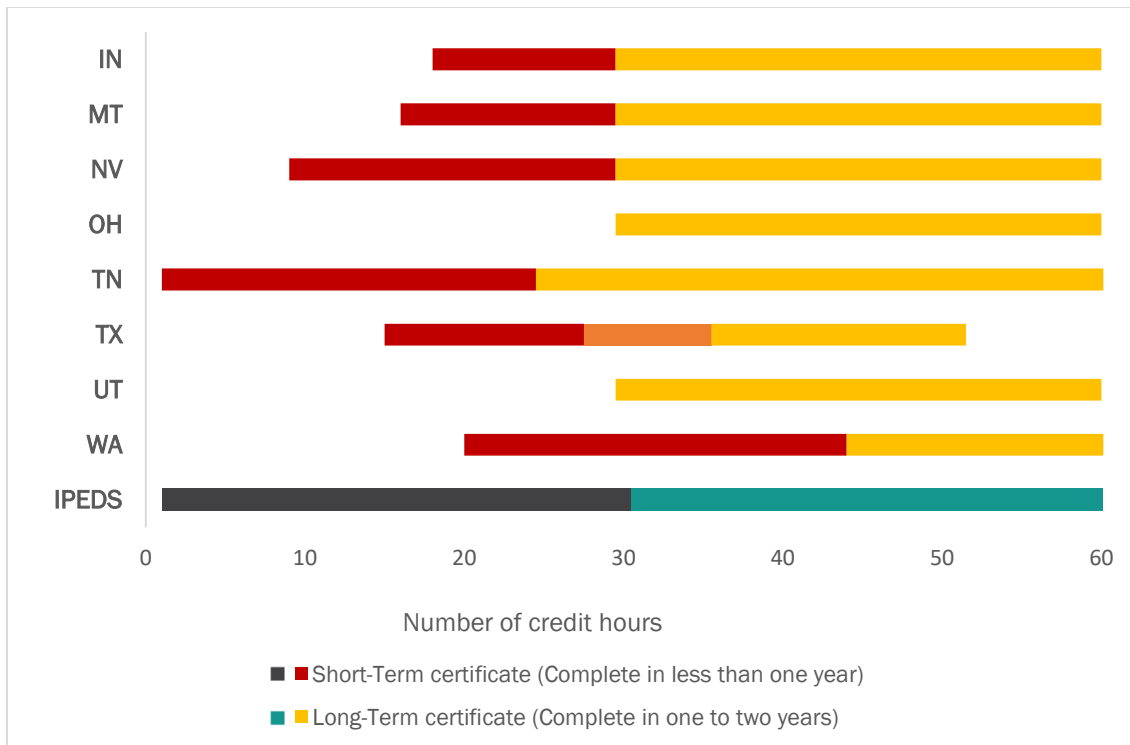
Table 3. Reporting categories of certificates in IPEDS

CATEGORY OF CERTIFICATE	IPEDS REPORTING INSTRUCTION	NOTE
Less than one academic year	Less than 900 clock hours; less than 30 semester credit hours; or less than 45 quarter credit hours.	Also referred to as “short-term certificates”
At least one but less than two academic years	At least 900 but less than 1800 clock hours; at least 30 but less than 60 semester credit hours; or at least 45 but less than 90 quarter credit hours.	Also referred to as “medium-” or “moderate-term certificates”
At least two but less than four academic years	1800 or more clock hours; 60 or more semester credit hours; or 90 or more quarter credit hours.	Also referred to as “long-term certificates”

Figure 2 compares state definitions of short- and long-term certificates with the definitions used by IPEDS. It includes the seven states that set credit hour minimums for short- and long-term certificates to be rewarded under their OBF formulas, as well as Tennessee, which does not specify a credit hour minimum, but sets 24 credit hours as the threshold between short- and long-term certificates. The figure clearly demonstrates the ways in which IPEDS definitions do not align with state definitions of certificate length.

Figure 2. Comparing state definitions for short- and long-term certificates with those used in IPEDS

³⁰ Ibid.



Notes:

1. Seven states (about a third of states that include certificates in their OBF formulas) specify a minimum number of credit hours required for the certificate to qualify as an outcome metric.
2. Tennessee defines short- and long-term certificates by credit hour requirements, but does not define a credit-hour minimum for short-term certificates.
3. Ohio and Utah do not reward short-term certificates in their OBF formulas.
4. The orange bar indicates an overlap in classification of certificates by credit hours. Texas does not classify certificates as short- and long-, but by levels 1, 2, and advanced. Level 1 certificates require from 15 to 42 credit hours, level 2 certificates require from 30 to 51, and advanced technology certificates require from 30 to 50 credit hours.

Figure 2 indicates that research based on IPEDS classifications would over-count qualifying short-term certificates in each of these OBF states, and mis-specify some certificates that count as “long-term” in Tennessee as short-term. For these reasons, analyses based exclusively on IPEDS cannot accurately distinguish between definitions of short- and long-term certificates for all OBF states.

IPEDS only includes total certificates awarded by institution. But some OBF formulas do not recognize and/or discount multiple certificates earned within one reporting year by the same student. IPEDS reports total certificates awarded by an institution for each academic year. In contrast, some OBF policies only reward one credential per field per student per academic year. For example, in New Mexico, if a student earns two certificates in one year on the way to an associate degree within that academic year, institutions can report three credentials to IPEDS. However, the formula only recognizes the associate degree earned. This discrepancy between what is reported to IPEDS and what states recognize in their OBF formulas poses challenges for those seeking to understand the degree to which the number of certificates awarded in a state is due to OBF.

IPEDS does not include consistent data on student subgroups typically included in OBF formulas. Certain student characteristics were not available in IPEDS until after the implementation of some states’ OBF formulas, e.g., age categories and Pell-recipient status. As a result, changes in outcomes of these student populations cannot be measured—even though

several states provide incentives for institutions to prioritize these students in their OBF policies.³¹ While NCES continues to expand postsecondary data elements and improve data reporting procedures across IPEDS surveys, the range of student groups identified as focus populations in OBF formulas is not fully available in the database. As a result, analyses cannot assess how certificate attainment across these student groups has changed since OBF formulas have been implemented, nor whether incentives to produce certificates among these subgroups has had an effect.

B. Statewide Longitudinal Data Systems (SLDS)

SLDS provide state-specific, student-level longitudinal data that may include a range of pre-K, K-12, postsecondary, and workforce variables.

The scope and quality of SLDS vary considerably across states. States with higher data capacity and well-developed SLDS link pre-K through workforce student record data. Many SLDS that track postsecondary education support analyses that can be used to examine a wide array of student behaviors and outcomes, including student mobility, field of study, transfer between two- and four-year sectors, and post-baccalaureate employment, but others are more limited.³²

Benefits of Using SLDS to Examine Certificates in OBF

SLDS can capture the specific types of certificates rewarded by OBF in a particular state.

SLDS frequently include more detail about certificates than does IPEDS. Specifically, while IPEDS uses a minimum of 30 credit hours to distinguish long-term certificates, states frequently use different credit hour minimums in determining which certificates to categorize and reward certificate completion. Utilizing a state's longitudinal data system can provide data elements that capture this type of variation.

Example: Tennessee

Tennessee defines short-term certificates as those requiring less than 24 credit hours. IPEDS classifies any certificate with less than 30 credit hours as a short-term certificate. However, Tennessee's SLDS can be used to construct a count of short-term certificate production that more closely aligns with how they are being incentivized through the OBF policy. As can be seen in Table 4, IPEDS over-counts the number of short-term certificates rewarded by Tennessee's OBF formula by 19 percent.

In contrast, IPEDS undercounts the number of long-term certificates rewarded by Tennessee's OBF formula. As Table 4 indicates, Tennessee defines long-term certificates as "at least 24 credit hours

³¹ For example, degree/credential attainment by adult students only became measurable in 2012 with the addition of the student age group variable. In IL, MN, and TN, states provide bonus weights on certificates earned by adult students.

³² Levesque, K., Fitzgerald, R., and Pfeiffer, J. (2015). *A Guide to Using State Longitudinal Data for Applied Research*. [Analytic Technical Assistance and Development by Institute of Education Sciences]

completed.” IPEDS defines long-term certificates as “more than 30 credit hours completed.” As a result, IPEDS identifies 23 percent fewer long-term certificates than does Tennessee’s SLDS.

Table 4. Reported number of certificates awarded in Tennessee by data systems (2016)

CERTIFICATE TYPE	SLDS	IPEDS	% DIFFERENCE	EXPLANATION FOR MISALIGNMENT
Short-term certificates	3345	4033	19%	Credit hours required: IPEDS defines as “less than 30 credit hours” but Tennessee uses 23 as the maximum. The state’s SLDS allows for analyses that accurately capture this nuance.
Long-term certificates	2302	1818	23%	Numbers of credit hours required: IPEDS defines as “30 or more credit hours” but Tennessee uses 24 as the minimum. The state’s SLDS allows for analyses that accurately capture this nuance.

Note: Tennessee’s SLDS provides data on credits earned for credentials at the student level and allows researchers to classify types of certificates to align with Tennessee’s formula.

SLDS contains individual student-level characteristics that researchers can use to track changes incentivized by some OBF formulas. As noted above, OBF policies vary in terms of whether and how they recognize certificate attainment among specific student populations. Frequently, IPEDS does not capture these student characteristics.

Example: Indiana

Indiana only rewards credentials earned by state residents within its OBF formula. However, IPEDS differentiates credential attainment by U.S. citizenship only. As a result, IPEDS over-reports the number of certificates recognized by Indiana’s OBF policy by 11 percent, as seen in Table 5.

Table 5. Number of certificates awarded in Indiana by citizenship vs. residency status (2016)

CERTIFICATE TYPE	IPEDS: 30 OR MORE CREDIT HOURS (ALL US CITIZENS)	SLDS: 30 OR MORE CREDIT HOURS (INDIANA RESIDENTS ONLY)	% DIFFERENCE	EXPLANATION FOR MISALIGNMENT
Long-term certificates	8125	7288	11%	Indiana only rewards certificates earned by state residents but IPEDS provides the number of certificates earned by US citizens regardless of residency.

Note: Indiana added short-term certificates as outcomes in its 2017-19 updates of metrics, but the 2017 SLDS data were not available at the time of this analysis.

Limitations of Using SLDS to Examine Certificates in OBF

SLDS can support an array of research methods that examine the effect of OBF policies on certificates within states, but they are also limited in the following ways:

- **SLDS are not publicly available, and data files may require significant preparation to support analysis.** Although many states have well-established processes for making SLDS available to researchers, data sharing agreements, timelines, and costs vary by state. In addition, SLDS are designed for administrative purposes and SLDS data files often require extensive verification and cleaning to be completed prior to analysis.
- **Although most states developed SLDS around the same time, the data collection cycle varies by state.** For example, some states collect degree attainment once per academic year, but others collect data every semester.³³
- **The quality and availability of data varies by state.** We also observe variations in data reporting practices and availability of data before and after the implementation of OBF. Some states only began tracking OBF formula outcomes in their SLDS after the policy was adopted. The absence of pre-OBF data for some outcomes makes it difficult to measure the effects of the policy. In addition, inconsistency in the availability of some data items across states limits the feasibility of extensive cross-state analyses.
- **Not all SLDS connect postsecondary and workforce data.** This lack of consistency across different SLDS systems hampers researchers' ability to track the labor market impact of certificates in OBF formulas that reward certificate completion.

C. State Workforce Data

State workforce data are typically collected annually at the individual level by Departments of Labor and Workforce Development in each state. They capture employment after graduation, median wage, education level required by different occupations and industries, and employment aligned with state priorities.

When combined with postsecondary data, workforce data can support a better understanding of credential attainment in prioritized fields and industries rewarded by OBF. Nine of 21 states prioritize certificates in specific fields or industries in their OBF policies. These industries are identified through state departments of workforce as areas of growth or need, and credentials aligned to those industries are rewarded through OBF. Workforce data are therefore critical in understanding whether this prioritization has increased aligned credential production.

Both IPEDS and SLDS data enable researchers to examine credential production by Classification of Instructional Programs (CIP) codes, but not all states use CIP or major fields to designate the prioritized fields that will be rewarded through OBF. For example, Louisiana and Wisconsin periodically identify priority jobs using Standard Occupational Classification (SOC) codes which are not directly available in either IPEDS or SLDS data. However, a crosswalk between workforce SOC and CIP codes exists, which enables researchers to obtain an accurate number of credentials earned in prioritized fields. Research aimed at understanding the impact of prioritizing workforce-aligned credentials in OBF formulas must take this additional step to ensure that they are measuring these outputs accurately.

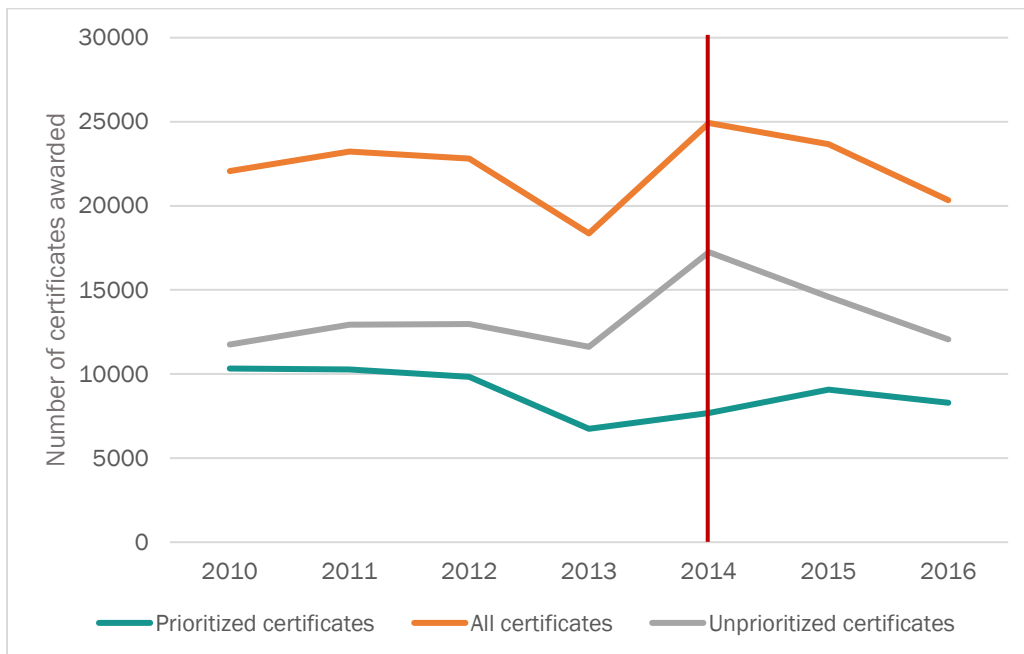
³³ Levesque, K., Fitzgerald, R., and Pfeiffer, J. (2015). *A Guide to Using State Longitudinal Data for Applied Research*. [Analytic Technical Assistance and Development by Institute of Education Sciences]

Alternatively, if researchers fail to attend to the presence of misalignment between SOC and CIP classifications, the discrepancies can substantially skew an analysis of OBF impact. We present the following example of certificate production in Louisiana to highlight the differences in results.

Example: Louisiana

In Louisiana’s current OBF policy, workforce certificates that lead to “four- and five-star jobs” earn a bonus under the OBF formula.³⁴ Combining IPEDS data with data from Louisiana’s Workforce Commission³⁵ in Figure 3, we present a summary of certificate production from 2010 to 2016, highlighting changes since 2014, the year that OBF was adopted in Louisiana.

Figure 3. Certificate production in Louisiana (Data Source: IPEDS 2010-2016)



Note: The red line indicates the year Louisiana adopted performance based funding (2014).

Figure 3 shows that the overall number of certificates reported in IPEDS declined by 18 percent, as did the number of certificates not prioritized in the state’s OBF formula. Yet the number of prioritized certificates increased by 8 percent (see Appendix B for more details). If an analysis of the effect of OBF on certificate production does not capture these distinctions, it could lead to very different conclusions about the effects of OBF.

Similarly, in a recent study of the impact of OBF with STEM incentives on STEM bachelor’s degree completions, Li used workforce data to account for variation in prioritized outcomes and found that STEM incentives resulted in increased production of STEM bachelor’s degrees.³⁶ Analogous

³⁴ Retrieved from <https://regents.la.gov/wp-content/uploads/2018/03/4c-Outcomes-Based-Funding-Formula-Overview.pdf>

³⁵ Retrieved from <http://www.laworks.net/Stars/default.aspx>

³⁶ Li, A. Y. (2018). Performance funding policy impacts on STEM degree attainment. *Educational Policy*. Retrieved from <http://journals.sagepub.com/doi/abs/10.1177/0895904818755455>.

research incorporating workforce data is needed to assess the effects of the prioritization of fields through OBF on certificate production in the two-year sector.

IV. Implications for Research on OBF and Certificates

Research on OBF and certificates is complicated by four factors. First, there is significant and wide-ranging variation in certificate definitions, length, type, and labor market value across states. Second, whether and how states include certificates in their OBF policies varies widely as well. Third, state formulas change often, which can have implications for which certificates are rewarded and how. Lastly existing databases, particularly IPEDS, do not capture these variations. Here, we highlight a range of recommendations for researchers to consider when examining certificate production following the implementation of OBF policies.

Analysis of OBF’s impact on any outcome, and especially certificates, requires accuracy in identifying the specific outcomes rewarded under each state’s funding formula. For example, one study examining the impact of OBF on short-term certificates included Ohio, whose formula does not reward short-term certificates; and another used IPEDS to measure short-term certificate production in a state whose credit hour definition for short-term certificates is misaligned with those of IPEDS.^{37,38} Such data limitations in IPEDS prevent studies from accurately accounting for the type of certificates some states award.³⁹

Similarly, seven out of the 21 states examined in this brief only reward certificates if they are in a field that aligns with state workforce development or in STEM and health fields. For example, Wisconsin only rewards degrees and certificates in the top 50 occupations identified by the Department of Workforce Development as projected new or opening fields. In 2016, only 5 percent of the total number of certificates reported by IPEDS were earned in major fields on the top 50 occupation lists.⁴⁰ Future research on the impact of OBF in these states would be more accurate if it isolated the impact of the policy on certificates in the fields of study directly rewarded by the states’ formula.

Researchers should confirm with states how they define and reward certificates in OBF policy before examining the impact of the policy, and clearly indicate which certificates they include in their analyses. States do not always make public their rules for defining, rewarding, or tracking certificate production in OBF policies. Moreover these rules can change frequently, which in turn can lead to changes in data reporting. For example, Nevada did not include short-term certificates in its OBF policy until 2013, hence some institutions only tracked short-term certificates after the policy update. To address such issues, it is often necessary to talk with one or more state policymakers to obtain a complete and accurate description of the treatment of certificates in OBF

³⁷ Li, A. Y. & Kennedy, A. I. (2018). Performance funding policy effects on community college outcomes: Are short-term certificates on the rise? *Community College Review*, 46(1), 3-39.

³⁸ Hillman, N. W., Tandberg, D. A., and Fryar, A. H., (2015). Evaluating the impacts of “new” performance funding in higher education. *Educational Evaluation and Policy Analysis*, 37(4): 501-519. doi: 10.3102/0162373714560224.

³⁹ Sykes, A. (2012). Defining and Reporting Subbaccalaureate Certificates in IPEDS (NPEC 2012-835). U.S. Department of Education. Washington, DC: National Postsecondary Education Cooperative. Retrieved March 15th 2018] from <https://nces.ed.gov/pubs2012/2012835.pdf>

⁴⁰ See Appendix B for methodology.

policy. While this process can be time-consuming, it is foundational to an accurate analysis of how OBF policies have affected certificate production.

Future research should examine whether OBF policies have a larger impact on certificates in high-demand fields than on other certificates. Sixteen states explicitly incentivize institutions to focus on producing more certificates that are aligned with state workforce and economic development: seven states use high-demand fields to limit what certificates are included as outcomes, while nine use incentives such as more weights or premiums. When examining the policies' effects on certificate production, researchers should consider exploring how production varies across fields.

An analysis of the impact of OBF on certificate production should explore effects on student attainment across focus populations. IPEDS reports certificate completions disaggregated by certain demographic characteristics. This allows researchers to examine if OBF policies with bonuses for some focus populations result in more certificates for those populations than OBF policies without a bonus. For example, Montana provides bonuses to institutions for certificates earned by adult and American Indian students. IPEDS completion data indicates that in 2015, 1,225 Montana students graduated with a certificate and among them, 56 percent were adult students and 16 percent were American Indian students. Further research should examine how such bonuses affect certificate attainment for targeted subgroups as compared to states without such bonuses.

Research should examine if the proliferation of certificates under OBF differs between states that reward certificate and degree production equally and those that weight certificates lower. Some researchers have hypothesized that community colleges respond to OBF by producing more certificates and fewer associate degrees. Yet some states don't reward certificate production at all in their policies, and others reward less for certificates than they do for degrees (see Table 2).⁴¹ Future research should provide a more nuanced exploration of the effects of OBF on certificate production by taking into account these kinds of variations. The incentive for institutions to "shift" from associate degree production to certificate production is likely to vary at least to some degree according to these differential weights.

Linking data sources such as SLDS and state workforce data can help address challenges posed by the limitations of single data sources. Twenty-six states to date have statewide longitudinal data systems to facilitate policy decision-making or accountability reporting.⁴² Many states have plans to expand and improve their system's capacity to collect, link, and share longitudinal data within and across states. States have also developed standard codes across educational and labor market outcomes which enable tracking, comparison, and measurement of state educational and skill development progress. Combining these data sources would allow for identification of longitudinal trends in student outcomes, examination of variation across student demographics and other characteristics, and analysis of the links between education, the state economy, and workforce development. Researchers studying the impact of OBF are encouraged to

⁴¹ Hillman, N. W., Fryar, A. H., and Crespín-Trujillo, V. (2017). Evaluating the impacts of performance funding in Ohio and Tennessee. *American Educational Research Journal*, 55(1): 1144-170.

⁴² Armstrong, J. and Zaback, K. (2016). *Assessing and Improving State Postsecondary Data Systems*. Retrieved from http://www.ihep.org/sites/default/files/uploads/postsecdata/docs/resources/state_postsecondary_data_systems.pdf

integrate these data sources in order to capture the variation in policies and their effect on different groups of students.

Conclusion

Arriving at an accurate and complete appraisal of state OBF policy is a challenging exercise. OBF policy is complex, changes frequently, and varies significantly by state. The same is true for important elements of the policy that are not formally codified, such as implementation timelines and strategies. For these reasons, complete and accurate descriptions of OBF policies requires in-depth examination of written policy, determination of the status of policy implementation, and member-checks with state policymakers. This exercise is foundational to arriving at an accurate understanding of how to categorize states when conducting analyses of the effects of OBF policies.

States have taken varied and complex approaches to determining whether, which, and how certificates are rewarded by their OBF formulas. Moreover, certificates themselves vary substantially. To date, this nuance has not been reflected in the preeminent literature on OBF. Yet it is incumbent upon researchers to capture these variations as they assess the effects of OBF on certificate completion and debate whether and under what circumstances certificates should be included in OBF policy. This brief identifies a range of challenges as well as possible solutions to better capture important variations in certificates and how they are recognized in OBF formulas.

About Research for Action

Research for Action (RFA) is a Philadelphia-based nonprofit education research organization. We seek to use research as the basis for the improvement of educational opportunities and outcomes for traditionally underserved students. Our work is designed to: strengthen public schools and postsecondary institutions; provide research-based recommendations to policymakers, practitioners, and the public at the local, state, and national levels; and enrich the civic and community dialogue about public education. For more information, please visit our website at www.researchforaction.org.

Acknowledgments

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Appendix A: Sources for Table 1

Arkansas: retrieved from

<http://www.arkleg.state.ar.us/assembly/2011/2011R/Acts/Act1203.pdf>

Colorado: retrieved from <https://higherred.colorado.gov/Publications/General/1319/default.html>

Florida: retrieved from http://www.flbog.edu/board/office/budget/performance_funding.php

Hawaii: retrieved from

http://www.hawaii.edu/offices/app/hgi/A_Performance_Funding_Model_Description_FY2019v2.pdf

Illinois: retrieved from <http://legacy.ibhe.org/PerformanceFunding/PDF/Overview.pdf>

Indiana: retrieved from

https://www.in.gov/che/files/2018_PF_Evolution_Notes_5_31_18_wnotes.pdf

Kentucky: retrieved from <http://cpe.ky.gov/policies/data/technicalguide.pdf>

Louisiana: retrieved from <https://regents.la.gov/wp-content/uploads/2018/03/4c-Outcomes-Based-Funding-Formula-Overview.pdf>

Michigan: retrieved from

[http://www.mcca.org/uploads/ckeditor/files/Analysis%20as%20Passed%20By%20The%20House%20\(4_27_2016\).pdf](http://www.mcca.org/uploads/ckeditor/files/Analysis%20as%20Passed%20By%20The%20House%20(4_27_2016).pdf)

Montana: retrieved from <http://mus.edu/data/performancefunding/MUS-PerformanceFundingCriteria5-19-16.pdf>

Nevada: retrieved from https://nshe.nevada.edu/wp-content/uploads/Funding-Model-Summary-Revised_8_12.pdf

New Mexico: retrieved from

<http://www.hed.state.nm.us/uploads/files/NM%20I%20%26%20G%20funding%20formula/New%20Mexico%20HED%20Funding%20Formula%20-%202017%20Technical%20Guide%20for%20FY18%20Budget%20Cycle.pdf>

New York: retrieved from <https://www.suny.edu/about/leadership/board-of-trustees/meetings/webcastdocs/6%20-%20Job%20Linkage%20Incentive%20Funding%20Program%20Summary.pdf>

North Carolina: retrieved from https://www.nccommunitycolleges.edu/sites/default/files/state-board/finance/fc_12_-_fy2017-18_state_aid_allocation_and_budget_policies_revised_08.16.2017.pdf

Ohio: retrieved from <https://www.ohiohighered.org/press/new-performance-based-model-higher-education-ohio>

Tennessee: retrieved from

https://www.tn.gov/content/dam/tn/thec/bureau/fiscal_admin/fiscal_pol/obff/Detailed_Outcomes_Formula_Definitions_01-2016.pdf

Texas: retrieved from https://tacc.org/sites/default/files/documents/2018-08/performance_based_funding_for_community_colleges.pdf

Utah: retrieved from <https://higherredutah.org/higher-ed-appropriations-approves-performance-funding-model/>

Virginia: retrieved from <http://trcenter.vccs.edu/wp-content/uploads/2016/12/Performance-Funding-Measures-and-Definitions.pdf>

Washington: retrieved from <https://www.sbctc.edu/about/agency/initiatives-projects/student-achievement-initiative.aspx>

Wisconsin: retrieved from

<http://www.wtcsystem.edu/wtcsexternal/cmspages/getdocumentfile.aspx?nodeguid=1d03093d-ecfe-4317-83af-4e3e3c2dbcad>

Appendix B: Methodological Notes for Example Analyses

This Appendix provides short descriptions for the analyses presented in this brief that use data from SLDS and/or workforce sources, explaining data definitions and our approach.

Analysis in Table 4. Reported Number of Certificates Awarded in Tennessee by Data Systems (2016)

This analysis is conducted to understand the discrepancy in the total number of short-term and long-term certificates earned if different credit hour requirements apply to the count. To align with Tennessee’s OBF policy, we applied the same definitions as Tennessee outlines in a comprehensive operational definition document of their OBF policy.⁴³ We generated a total number of certificates earned by Tennessee community college students in academic year 2016 by short-term and long-term programs as defined by Tennessee’s credit hour requirements (less than 24 credit hours vs. 24 credit hours or more). To compare with IPEDS data, we downloaded the 2016 completion data and examined the list of community colleges to make sure our institution sample is accurate and completely aligned. IPEDS completion data includes a variable named “Award Level,” which categorizes certificates into the classification in Table 3. We compared the number of certificates by different credit hour requirements in IPEDS and SLDS and present our findings in Table 4.

The following table contains our data restrictors to Tennessee SLDS data according to their OBF policy metrics:

Table B1. Data restrictors used in Tennessee SLDS data summary

CERTIFICATE TYPE	SLDS		IPEDS	
	Short-term certificates	Long-term certificates	Short-term certificates	Long-term certificates
Year	2016	2016	2016	2016
Institution Level	2-yr colleges	2-yr colleges	2-yr colleges	2-yr colleges
Credit Hour Requirement	Credit hours (<24)	Credit hours (>=24)	Award level (less than one year)	Award level (one to two years)
Types of Certificates	Excluding General Education certificates associated with CIP code: 24.0101 & 51.0000	Excluding General Education certificates associated with CIP code: 24.0101 & 51.0000	Excluding General Education certificates associated with CIP code: 24.0101 & 51.0000	Excluding General Education certificates associated with CIP code: 24.0101 & 51.0000
Citizenship	Citizen only	Citizen only	Citizen only	Citizen only

⁴³ Outcomes Based Funding Resources Tennessee Higher Education Commission and Student Assistant Corporation. Retrieved from <https://www.tn.gov/thec/bureaus/finance-and-administration/fiscal-policy/redirect-fiscal-policy/outcomes-based-funding-formula-resources/redirect-outcomes-based-funding-formula-resources/2015-20-outcomes-based-funding-formula.html>.

Analysis in Table 5. Reported Number of Certificates Awarded in Indiana by Data Systems (2016)

This analysis is conducted to understand the discrepancy in the total number of long-term certificates earned if no residency status is applied to the count. According to Indiana’s policy, only the credentials earned by Hoosiers are considered in the outcomes.⁴⁴ We generated a total number of long-term certificates earned by students’ residency status in academic year 2016 and compared it with IPEDS completion data. IPEDS completion data does not account for state residency, only providing the total number of certificates earned by citizen and non-citizen students. The following table contains our data restrictors to Indiana SLDS data according to their OBF policy metrics:

Table B2. Data restrictors used in Indiana SLDS data summary

CERTIFICATE TYPE	SLDS	IPEDS
	Long-term certificates	Long-term certificates
Year	2016	2016
Institution Level	Two-year colleges	Two-year colleges
Residency/Citizenship	Resident only	Citizen only

Analysis of Figure 3. Certificate production in Louisiana (Data Source: IPEDS 2010-2016)

We conducted this trend analysis to examine if there is a difference in changes over time between prioritized certificates and other certificates in Louisiana before its OBF was updated in FY 2017. Louisiana’s previous OBF requires certificates to be on the list of four- and five- star jobs defined by Louisiana Workforce Commission to be rewarded as outcomes. We downloaded workforce information from the Commission’s website, which provides a Standard Occupational Classification (SOC) code for each star job. To link the star jobs with corresponding major fields as used in IPEDS to report the number of certificates earned by programs, we converted the SOC codes to CIP codes by the NCES SOC to CIP Crosswalk. By linking the star job list with institutions’ completion data, we explored the change of certificate production among four- and five- star jobs and others in Louisiana before and after the implementation of OBF.

Analysis of Wisconsin Top 50 Occupations (2016)

Wisconsin’s policy requires certificates to be on the “Hot Job” list as determined by Wisconsin Department of Workforce Development.⁴⁵ Hot Jobs are “high projected growth occupations” with median salaries above the state median, for which the percent of growth is greater than state average, and in which there are the most projected job opportunities.⁴⁶ We obtained the 2016 Hot Job list and matched the Standard Occupational Classification (SOC) codes for the Top 50

⁴⁴ Performance-Based Funding: FAQ. Indiana Commission for Higher Education. Retrieved from <https://www.in.gov/che/files/Performance%20Funding%20FAQ%20FINAL.pdf>

⁴⁵ Retrieved from <https://www.jobcenterofwisconsin.com/wisconsin/pub/hotjobs>

⁴⁶ Ibid.

occupations by their description. Occupations were only included if descriptions included certificates as their minimal education attainment requirement. Using the NCES SOC to CIP Crosswalk⁴⁷ to convert SOC code to CIP codes and linking to IPEDS completions data, we estimated the percent of students who earned certificates in these matched Hot Job fields as of the total number of certificates awarded in 2016. One limitation of this analysis is that we were not able to retrieve the Hot Job list prior to Wisconsin's implementation of OBF in 2015, so this analysis is only descriptive of the proportion of certificates earned in Hot Job fields in 2016.

⁴⁷ Retrieved from <https://nces.ed.gov/ipeds/cipcode/resources.aspx?y=55>