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Credential Production by Field and Labor Market Alignment at Minority-Serving Institutions: A Descriptive Analysis

A CAPSEE Working Paper

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September 2018

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305C110011 to Teachers College, Columbia University. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

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Abstract

Scholarship on minority-serving institutions (MSIs) has established the critical role they play in spite of significant financial constraints. At the same time, descriptive statistical analyses have also found that MSIs, as a group, have lower completion rates than the national average. More research is thus needed on the factors underlying the institutional performance of MSIs. This paper presents broad analyses intended to provide a snapshot of one facet of MSI institutional performance—credential production. We conduct a descriptive analysis of credential production by field of study across the two- and four-year postsecondary education sectors and compare results for MSIs and non-MSIs. We find that for each credential type we examine—certificates, associate degrees, and bachelor's degrees—MSIs and non-MSIs have very similar credential production patterns by field. We also find that much of the credential production is concentrated in a relatively narrow set of fields. We complement the credential production analysis with an exploratory analysis of the extent to which the fields in which these credentials were earned align with employment in Alabama and California. We find state-level differences in the alignment between high-employment industries and the production of credentials in certain fields. We conclude this paper with a discussion of the research and policy implications of these findings.

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1. Introduction

A significant proportion of Black, Hispanic, Asian/Pacific Islander and Native American students (hereafter referred to as students of color) attend minority-serving institutions (MSIs), and postsecondary enrollment trends suggest that the number will grow. MSI is an umbrella term that describes seven institutional designations derived from federal legislation or targeted funding programs that require institutions to meet certain demographic criteria.[1] It is estimated that MSIs enroll 39 percent of all undergraduate students of color and that Hispanic-serving institutions (HSIs) enroll over half of all Hispanic college students (Cunningham, Park, & Engle, 2014). Between 2015 and 2026, the percentage of Black and Hispanic students enrolling in college is expected to increase by 20 percent and 26 percent, respectively. During the same time period, the percentage of White students enrolling in college is expected to increase by 1 percent (Hussar & Bailey, 2018). Many students of color are first-generation college goers. Some have weak academic preparation. And yet the vast majority aspire to earn at least a baccalaureate (Horn & Skomsvold, 2011). Colleges and universities—both MSIs and non-MSIs—must therefore be prepared to effectively serve the academic and nonacademic needs of these students (Cooper, McDonald, Albertine, Major, & McNair, 2016).

MSIs play an important role in the higher education landscape (Gasman & Conrad, 2013; Parker, 2012). Historically, the missions of these institutions have been tied to ensuring higher education access to students subject to racial discrimination and economic hardship (Harmon, 2012; Li, 2007). In part due to the confluence of race and class, MSIs typically serve disproportionate numbers of low-income students. More than half of students enrolled at MSIs receive Pell grants, compared to less than a third of all college students (Penn Center for Minority Serving Institutions, 2014). Federal education policy has expanded the number of MSI designations to reflect the growing racial diversity of the country and our postsecondary system, and to more directly address past and present obstacles to college success for students of color (U.S. Census Bureau, 2011; Harper, 2012).

MSIs generally have lower funding than non-MSIs. An analysis by Cunningham, Park, and Engle (2014) indicates that, in fiscal year (FY) 2010, on average, total revenue per full-time equivalent (FTE) student was approximately $16,648 at four-year public and private MSIs, compared to $29,833 at four-year public and private non-MSIs. Total revenue per FTE student was similar at two-year MSIs and non-MSIs at $10,192 and $10,341, respectively. Funding disparities also exist in academic research and development, as non-MSI Research I institutions generally have more robust fundraising capabilities, leaving MSIs at a competitive disadvantage.[2] A 2009 National Science Foundation report found that the top 100 institutions

[1] We describe these designations in further detail later in the paper.

[2] Research I is a category in the Carnegie Classification of Institutions of Higher Education that indicates universities in the United States that engage in extensive research activity. Carnegie Classification defines Research I institutions as those that: (1) offer a full range of baccalaureate programs, (2) are committed to graduate education through the doctorate, (3) give high priority to research, (4) award 50 or more doctoral degrees each year, and (5) receive annually $40 million or more in federal support.

accounted for roughly 80 percent of all academic research and development (R&D) funding in FY 2006. Furthermore, data from FY 1999–2007 show that while research-performing Historically Black College or Universities are approximately 6 percent of all U.S. institutions conducting R&D, they receive only about one percent, on average, of all federal academic R&D support (Matthews, 2011).[3]

Scholarship on MSIs has established the critical role they play and their many accomplishments—in spite of financial constraints. At the same time, descriptive statistical analyses have also found that MSIs have lower completion rates than the national average (see U.S. Department of Education, 2011, 2013; Gasman & Conrad, 2013; Cunningham et al., 2014; Flores & Park, 2015). More research is thus needed on the institutional performance of MSIs and, in particular, on how federal and state policies and programs can be better designed and enacted in ways that strengthen their institutional capacity. Currently, the U.S. Department of Education Office of Postsecondary Education (OPE) Institutional Service programs provide funding for a vast array of specific functions and activities at MSIs—ranging from capital projects to academic support programs to STEM initiatives.[4] Rigorous evaluations of these investments are few (U.S. Government Accountability Office, 2007; Teranishi, Martin, Pazich, Alcantar, & Nguyen, 2014), and the discourse about the utility of federal investments in MSIs can be socially and politically charged (Johnson & Rigueur, 2017). We argue that practitioners, policymakers, and researchers must work in closer partnership to learn what types of federal and state investments and institutional conditions are associated with stronger student outcomes. Without this information and appropriate policy action, the full potential of MSIs will not be realized.

This paper presents foundational analyses intended to provide a snapshot of one facet of MSI institutional performance—credential production. Credential production in this analysis is the percentage of certificates and degrees awarded by major or occupational field. We conduct a descriptive analysis of credential production by field of study across the two-year and four-year postsecondary education sectors and compare results for MSIs and non-MSIs. We find that for each credential type we examine—certificates, associate degrees, and bachelor's degrees—MSIs and non-MSIs have very similar credential production patterns by field. We also find that much of the credential production is concentrated in a relatively narrow set of fields. We complement the credential production analysis with an exploratory analysis of the extent to which the fields in which these credentials were earned align with employment in the labor market. Using a two-state case study approach, we find state-level differences and possible misalignment between high-employment industries and the production of credentials in certain fields. We conclude this paper with a discussion of the research and policy implications of our findings.

[3] See Minor (2008) for more information on state and federal funding disparities among flagship predominately White institutions and HBCUs in Alabama, Louisiana, Mississippi, and North Carolina.

[4] Most of these programs are funded under Title III and Title V of the Higher Education Act of 1965. See the U.S. Department of Education OPE Institutional Service page (https://ed.gov/about/offices/list/ope/idues/index.html) for more information on federally funded programs and initiatives for MSIs.

2. Credential Production Analysis

Research on the institutional performance of MSIs reveals variation across sectors (Gasman & Conrad, 2013; Li, 2007). Community colleges that are MSIs have lower graduation rates than those that are not MSIs. But public four-year colleges and universities that are MSIs have higher graduation rates than other public four-year colleges (Bergeron, Ahmad, & Baylor, 2014). Research suggests that these differences are rooted in higher concentrations of poverty and academic underpreparation among students at community colleges, which enroll more students of color (Nguyen et al., 2015; U.S. Department of Education, 2016b), and in the enhanced academic and social integration associated with the specialized missions of certain MSIs (e.g., Historically Black Colleges and Universities) at the four-year level (Gasman & Nguyen, 2016). While existing research provides a snapshot of the differences in overall credential production between MSIs and non-MSIs, there is limited data about the types of credentials students at MSIs and non-MSIs are earning and about which fields of study are represented by those credentials. Similarly, it is unclear whether differences exist across the two- and four-year sectors. This credential production analysis examines these issues.

MSI Designations

Minority-serving institutions can be difficult to categorize due to the various means by which they gain eligibility and designation. Certain MSI designations are permanent; others require institutions to meet eligibility criteria ("eligible") in order to apply for and be granted funding ("funded").

Some institutions are classified as MSIs based on federal legislation that identifies particular institutions as MSIs. For example, Title III of the Higher Education Act of 1965 identified criteria for the Historically Black College or Universities (HBCU) designation as those institutions established prior to 1964 and whose primary mission was to educate Black Americans. Tribally controlled Colleges and Universities (TCUs) can achieve MSI designation through three different legislative mechanisms: the Tribally Controlled College or University Assistance Act of 1978, the Navajo Community College Assistance Act of 1978, and the workings of the Bureau of Indian Education. Both HBCUs and TCUs are thus identified directly by law rather than through criteria that might change substantially over time, so the number of institutions qualifying for these designations is relatively limited and static.

Under Title III and Title V of the Higher Education Act of 1965, as amended in 1992 and 2007, there are five additional MSI designations: Alaska Native and Native Hawaiian-serving institutions (ANNHs), Asian American and Native American Pacific Islander-serving institutions (AANAPISIs), Hispanic-serving Institutions (HSIs), Native American-serving non-Tribal institutions (NASNTIs), and Predominately Black Institutions (PBIs). The demographic composition of undergraduate enrollment—the percentage of the enrollment by a particular minority student population—is used to identify institutions *eligible* for non-HBCU and non-

TCU designations that disproportionately serve ethnic and racial minority students. Table 1 lists the MSI designations.

Table 1: MSI Designations

Designation	Eligibility
Alaska Native and Native Hawaiian-serving institutions (ANNHs)	Institutions that have an undergraduate enrollment that is at least 20 percent Alaskan Native students or institutions that have an undergraduate enrollment that is at least 10 percent Native Hawaiian students
Asian American and Native American Pacific Islander-serving institutions (AANAPISIs)	Institutions that have an enrollment of undergraduate students that is at least 10 percent Asian American and Native American Pacific Islander students
Hispanic-serving Institutions (HSIs)	Institutions that have an undergraduate enrollment that is at least 25 percent Hispanic students
Historically Black College or Universities (HBCUs)	By statute
Native American-serving non-Tribal institutions (NASNTIs)	Institutions that are not TCUs that have an undergraduate enrollment that is at least 10 percent Native American students
Predominately Black Institutions (PBIs)	Institutions that are not HBCUs that have an undergraduate enrollment that is at least 40 percent Black students
Tribally-controlled Colleges and Universities (TCUs)	By statute

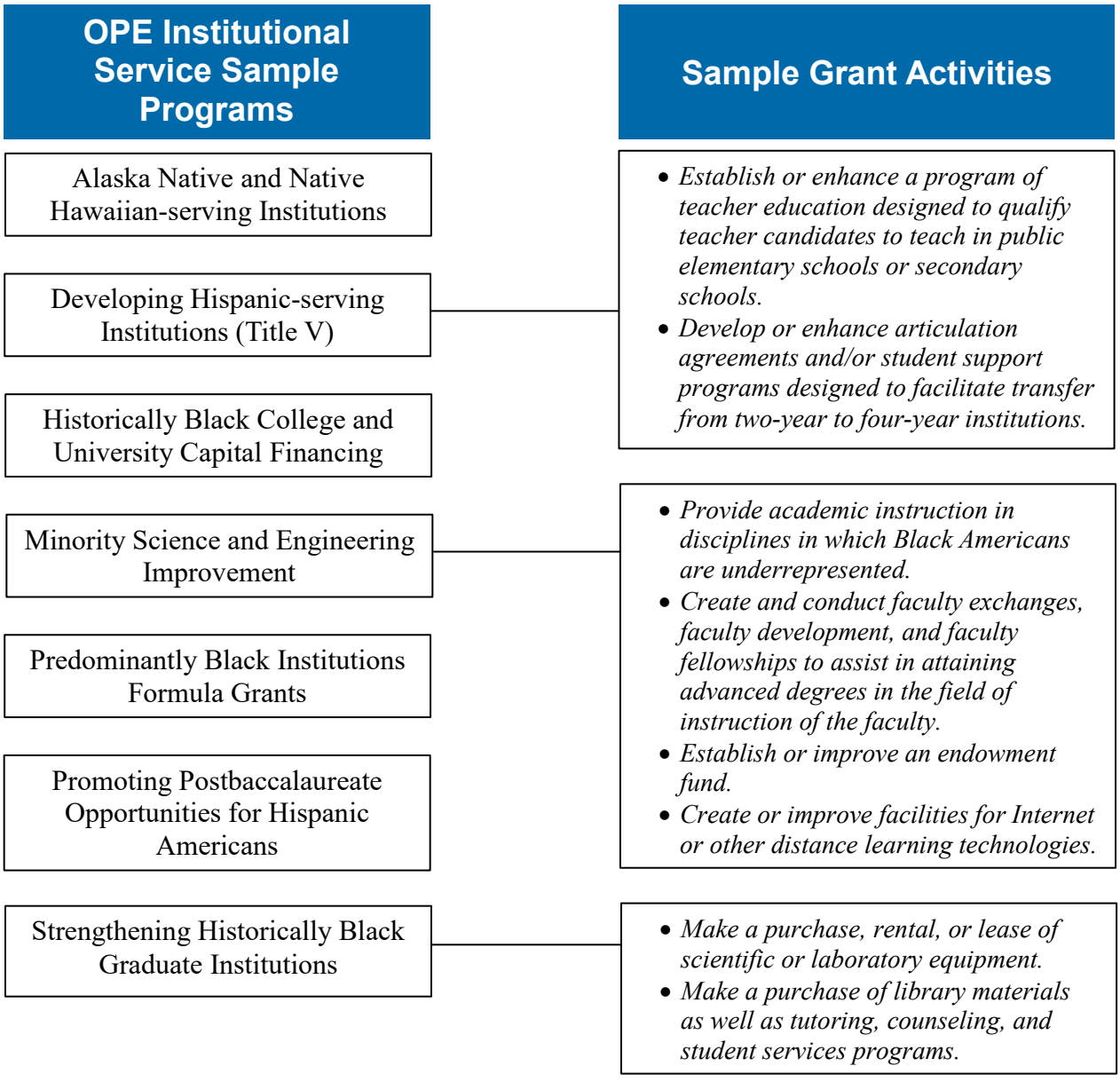
OPE Institutional Service Program Funding

While institutions can be *eligible* for MSI designation based upon their racial/ethnic demography, only institutions that apply for and are granted funding through OPE are given an official MSI designation. For our study, though nearly 600 institutions were eligible for MSI designation based upon student demographics, only 362 institutions received OPE funding and were granted official MSI designation in the year of analysis (Academic Year [AY] 2011-12). Institutions that are officially designated and funded as MSIs are listed on the OPE website (https://www2.ed.gov/about/offices/list/ope/programs.html) under each program as awardees for each fiscal year.

Under Title III and Title V, there are three divisions at OPE that provide support to MSIs for institutional services—Strengthening Historically Black Colleges and Universities, Strengthening Institutions, and Hispanic-serving Institutions. Within these divisions, there are roughly 20 institutional service programs targeted to all or specific MSI designations and offering programmatic support for a wide variety of institutional activities. Programs include Developing Hispanic-serving Institutions, Minority Science and Engineering Improvement,

Promoting Postbaccalaureate Opportunities for Hispanic Americans, and Strengthening Historically Black Graduate Institutions, among others. Grant activities range from investments in teacher or faculty professional development to endowments to capital projects. Figure 1 lists select OPE Institutional Service programs and provides examples of grant activities funded under some of these programs.

Figure 1. OPE Title III and Title V Institutional Funding



Sample and Method

The goal of this analysis is to evaluate credential production by field across sector, comparing MSI colleges to others that have similar demographic characteristics and selectivity as MSIs. Therefore, we use data from the Integrated Postsecondary Education Data System (IPEDS) and from OPE to construct MSI and non-MSI samples for comparison purposes.

For the MSI sample, first we determined whether institutions were *eligible* for Department of Education OPE programs supporting Institutional Service. The Institutional Service programs included in this analysis encompass the seven MSI designations listed in Table 1: AANAPISIs, ANNHs, HBCUs, HSIs, NASNTIs, PBIs, and TCUs. Second, we included institutions *funded* by the Department of Education OPE programs with official MSI designations in AY 2011-12. This resulted in a sample of all eligible and funded MSIs that includes 166 two-year colleges and 196 four-year colleges. Notably, HSIs dominate the two-year MSI sample, and HBCUs and HSIs dominate the four-year MSI sample.

Table 2: MSI Sample by Designation and Sector

Sector	AANAPISIs	ANNHs	HBCUs	HSIs	NANSTIs	PBIs	TCUs	Total
Two-year	8	6	12	83	7	30	20	166
Four-year	11	7	88	60	7	10	13	196

A non-MSI comparison group of institutions was identified using institutional characteristics and enrollment components data from IPEDS. This group of institutions shared student characteristics (e.g., race/ethnicity, socioeconomic status) and institutional characteristics (e.g., selectivity) with the eligible and funded MSI group described above. Specifically, the non-MSI group is composed of institutions with undergraduate enrollment that was at least 10 percent Native American, 25 percent Hispanic, 10 percent Asian American or Native American Pacific Islander, 20 percent Alaskan Native, 10 percent Native Hawaiian, or 40 percent Black. Additionally, at least 50 percent of undergraduate enrollments were Pell grant recipients at each of the non-MSI sample institutions. Lastly, 73 percent of institutions in the non-MSI sample had open admissions policies compared to 60 percent of institutions in the MSI sample. We used the demographic characteristics to create comparison groups for each MSI designation except for HBCUs and TCUs (since their designations are based upon federal legislation). Notably, some of the institutions in the non-MSI sample were *eligible* for MSI designation given the demographic characteristics of their student populations; however, they were not funded as MSIs in AY 2011-12 and therefore not included in our MSI sample.

Table 3: MSI and Non-MSI Institutional Characteristics Sample Comparison

Institutional Characteristics	MSIs (*n* = 362)	Non-MSIs (*n* = 564)
Race/Ethnicity of Students (percentage of targeted minority group in student population)		
ANNAPISIs	24%	32%
ANNHs	23%	20%
HBCUs	83%	—
HSIs	45%	39%
NANSTIs	21%	24%
PBIs	57%	58%
TCUs	89%	—
Selectivity (percentage of institutions with open admissions policies)		
ANNAPISIs	41%	64%
ANNHs	62%	87%
HBCUs	32%	—
HSIs	65%	80%
NANSTIs	50%	68%
PBIs	75%	69%
TCUs	97%	—
Pell Grant Status of Students (percentage of Pell grant recipients in student population)		
ANNAPISIs	41%	58%
ANNHs	38%	73%
HBCUs	73%	—
HSIs	48%	56%
NANSTIs	48%	57%
PBIs	60%	72%
TCUs	62%	—

To determine credential production by industry field, we merged the MSI and non-MSI data with National Center for Education Statistics (NCES) Classification of Instructional Programs (CIP) codes to disaggregate credentials by type (e.g., certificates, associate degrees, bachelor's degrees) and field (e.g., education and training, hospitality and tourism, information technology). To achieve this we used Perkins IV Crosswalks to link CIP codes and Occupational Information Network (O*NET) Standard Occupational Classification (SOC) codes to reflect the 16 National Career Clusters.[5] As a result, a total of 17 fields were established—16 career clusters as well as an "Other" category.

[5] The O*NET-SOC system is based on the 2010 Standard Occupational Classification (SOC) system, which organizes the nation's jobs into roughly 1,000 occupational codes.

We ran frequencies to compare MSI and non-MSI credential production across fields by sector (two- and four-year institutions) and by type of credential (certificate, associate degree, and bachelor's degree). We computed *p*-values by field for each analysis to determine whether differences between MSIs and non-MSIs were statistically significant. None of the differences observed between MSIs and non-MSIs were statistically significant. Our findings thus provide more insight about the fields in which degrees are clustered than about differences between MSIs and non-MSIs.

There are limitations to our institutional dataset that may impact our findings. In particular, while the completion of IPEDS surveys is mandatory for institutions that participate in or are applicants for participation in any federal student financial aid program authorized by Title IV of the Higher Education Act of 1965, IPEDS data is self-reported and subject to missing data and inaccuracies. Moreover, determinations of MSI eligibility and funding that we used to construct the MSI and non-MSI samples can be difficult to interpret. Some MSI-eligible institutions may not have been funded under the Institutional Service programs or may not have been funded in the year on which this analysis focuses. Relying on the "eligible and funded" criteria that we employ is useful for capturing those institutions that received funding due to their MSI designation, but other colleges with a strong mission focus on serving minority populations may not be included and indeed may be represented in the non-MSI comparison sample. Employing the "eligible and funded" criteria invariably underestimates the number of institutions serving significant proportions of students of color.

Findings

Table 4 presents credential production by field for the two-year sector. We limited the credentials in this analysis to certificates and associate degrees because they represent the vast majority of credentials awarded by two-year colleges. The top three fields for the MSI and non-MSI groups are quite similar, with education and training and health science as number one and two. Credentials in science, technology, engineering, and math (STEM) is the third highest field for MSIs and is tied with business, management, and administration as the third highest field for non-MSIs.

In general, credential production by field across two-year MSIs and non-MSIs was quite similar. Where there were differences, they appear to be a result of high credential production among a small number of MSI designations. For example, 35.2 percent of credentials awarded by MSIs were in the field of education and training compared to 31.3 percent by non-MSIs. That figure for HSIs was 37.2 percent. More than 40,000 credentials were awarded by HSIs in education and training, constituting 68 percent of credentials in this field for the MSI group.

Table 5 presents credential production by field for the four-year sector. The credentials included in this analysis are certificates, associate degrees, and bachelor's degrees. Again, MSIs and non-MSIs have similar credential production patterns and share the same top two fields: education and training and STEM. Business, management and administration is the third highest

Table 4: Total Credential Production (Certificates + Associate Degrees) by Field Among Two-Year Funded MSIs and Non-MSIs

Field	AANAPISIs *n* = 8	ANNHs *n* = 6	HBCUs *n* = 12	HSIs *n* = 83	NANSTIs *n* = 7	PBIs *n* = 30	TCUs *n* = 20	All MSIs *n* = 166	Non-MSI[a] *n* = 261
Agriculture, food & natural resources	90	10	3	888	115	131	26	1,263	1,897
%	0.7%	0.6%	0.0%	0.8%	3.8%	0.4%	2.5%	0.8%	0.8%
Architecture & construction	64	24	242	1,811	31	756	46	2,974	4,834
%	0.5%	1.4%	3.9%	1.7%	1.0%	2.2%	4.4%	1.8%	2.0%
Arts, A/V technology & communications	664	31	55	3,747	33	395	1	4,926	6,019
%	5.4%	1.8%	0.9%	3.5%	1.1%	1.1%	0.1%	2.9%	2.5%
Business, management & administration	753	37	458	7,939	252	2,973	109	12,521	18,270
%	6.1%	2.2%	7.4%	7.4%	8.4%	8.5%	10.4%	7.5%	7.7%
Education & training	4,462	877	1209	40,149	900	10,778	414	58,789	74,616
%	36.0%	51.8%	19.5%	37.2%	29.9%	30.8%	39.5%	35.2%	31.3%
Finance	338	63	110	1,899	14	806	31	3,261	4,817
%	2.7%	3.7%	1.8%	1.8%	0.5%	2.3%	3.0%	2.0%	2.0%
Government & public administration	12	0	0	119	0	18	0	149	170
%	0.1%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%	0.1%
Health science	1,326	269	1,675	17,705	671	7945	194	29,785	48,961
%	10.7%	15.9%	27.0%	16.4%	22.3%	22.7%	18.5%	17.8%	20.5%
Hospitality & tourism	187	173	241	1,180	12	786	7	2,586	4,166
%	1.5%	10.2%	3.9%	1.1%	0.4%	2.2%	0.7%	1.5%	1.7%
Human services	314	3	373	3647	183	1,227	46	5,793	8,259
%	2.5%	0.2%	6.0%	3.4%	6.1%	3.5%	4.4%	3.5%	3.5%
Information technology	460	42	152	2,638	60	1,122	13	4,487	6,710
%	3.7%	2.5%	2.5%	2.4%	2.0%	3.2%	1.2%	2.7%	2.8%
Law, public safety, corrections & security	118	13	28	972	7	498	0	1,636	2,025
%	0.9%	0.8%	0.5%	0.9%	0.2%	1.4%	0.0%	1.0%	0.8%
Manufacturing	341	33	720	2,916	212	2,904	6	7,132	14,348
%	2.8%	2.0%	11.6%	2.7%	7.0%	8.3%	0.6%	4.3%	6.0%
Marketing, sales & service	612	47	95	6,598	170	1,147	124	8,793	11,787
%	2.8%	2.8%	1.5%	6.1%	5.7%	3.3%	11.8%	5.3%	4.9%
STEM	1,809	28	285	12,620	128	1,112	23	16,005	18,296
%	14.6%	1.7%	4.6%	11.7%	4.3%	3.2%	2.2%	9.6%	7.7%
Transportation, distribution & logistics	448	42	554	2,961	220	2,309	7	6,541	12,538
%	3.6%	2.5%	8.9%	2.7%	7.3%	6.6%	0.7%	3.9%	5.3%
Other	385	0	3	101	0	38	0	527	542
%	3.1%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.3%	0.2%
Total	12,383	1,692	6,203	107,890	3,009	34,946	1,048	167,171	238,256

Note. Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), AY 2011-12, Institutional Characteristics component.

[a] Non-MSI comparison group institutions were identified using Institutional Characteristics and Enrollment components in Integrated Postsecondary Education Data System (IPEDS). Specifically, this group of institutions shared the racial demographic and selectivity of MSIs but were not officially categorized as funded MSIs in AY 2011-12.

Table 5: Total Credential Production (Certificates + Associate + Bachelor's Degrees) by Field Among Four-Year Funded MSIs and Non-MSIs

Field	AANAPISIs *n* = 11	ANNHs *n* = 7	HBCUs *n* = 88	HSIs *n* = 60	NANSTIs *n* = 7	PBIs *n* = 10	TCUs *n* = 13	All MSIs *n* = 196	Non-MSI[a] *n* = 303
Agriculture, food & natural resources	393	126	399	774	53	21	42	1,808	2,109
%	1.2%	2.0%	1.1%	0.7%	0.8%	0.3%	2.6%	0.9%	0.8%
Architecture & construction	158	44	228	894	22	16	70	1,432	1,714
%	0.5%	0.7%	0.6%	0.8%	0.3%	0.2%	4.3%	0.7%	0.70%
Arts, A/V technology & communications	2,826	471	3,073	7,006	322	567	54	14,319	16,979
%	8.50%	7.4%	8.7%	6.6%	4.9%	7.8%	3.3%	7.3%	6.5%
Business, management & administration	4,488	616	4,350	10,631	580	1,045	238	21,948	30,636
%	13.50%	9.7%	12.3%	10.1%	8.9%	14.4%	14.6%	11.2%	11.7%
Education & training	5,687	1,460	5,608	28,835	1,798	1,176	586	45,150	60,529
%	17.20%	23.0%	15.9%	27.3%	27.6%	16.2%	35.8%	23.0%	23.1%
Finance	1,589	358	1,333	4,624	286	244	29	8,463	10,909
%	4.80%	5.6%	3.8%	4.4%	4.4%	3.4%	1.8%	4.3%	4.2%
Government & public administration	960	204	975	1,821	84	336	8	4,388	5,258
%	2.90%	3.2%	2.8%	1.7%	1.3%	4.6%	0.5%	2.2%	2.0%
Health science	2,352	559	3,836	11,454	573	1,218	241	20,233	32,263
%	7.10%	8.8%	10.9%	10.8%	8.8%	16.7%	14.7%	10.3%	12.3%
Hospitality & tourism	307	174	339	1,419	81	20	11	2,351	2,784
%	0.90%	2.7%	1.0%	1.3%	1.2%	0.3%	0.7%	1.2%	1.1%
Human services	2,792	478	3,786	8,525	670	881	71	17,203	22,861
%	8.40%	7.5%	10.7%	8.1%	10.3%	12.1%	4.3%	8.8%	8.7%
Information technology	836	73	916	2,052	142	94	56	4,169	6,731
%	2.50%	1.1%	2.6%	1.9%	2.2%	1.3%	3.4%	2.1%	2.6%
Law, public safety, corrections & security	14	10	17	406	14	4	16	481	1,109
%	0.00%	0.2%	0.0%	0.4%	0.2%	0.1%	1.0%	0.2%	0.4%
Manufacturing	208	75	363	688	205	11	24	1,574	2,150
%	0.60%	1.2%	1.0%	0.7%	3.1%	0.2%	1.5%	0.8%	0.8%
Marketing, sales & service	1,592	349	3,155	8,091	392	230	43	13,852	17,360
%	4.80%	5.5%	9.0%	7.6%	6.0%	3.2%	2.6%	7.1%	6.6%
STEM	8,348	1,281	6,671	18,056	1,087	1,310	104	36,857	45,827
%	25.20%	20.2%	18.9%	17.1%	16.7%	18.0%	6.4%	18.8%	17.5%
Transportation, distribution & logistics	511	69	57	346	163	54	40	1,240	1,821
%	1.50%	1.1%	0.2%	0.3%	2.5%	0.7%	2.4%	0.6%	0.7%
Other	72	8	124	146	48	49	2	449	427
%	0.20%	0.1%	0.4%	0.1%	0.7%	0.7%	0.1%	0.2%	0.2%
Total	33,133	6,355	35,230	105,768	6,520	7,276	1,635	195,917	261,467

Note. Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), AY 2011-12, Institutional Characteristics component.

[a] Non-MSI comparison group institutions were identified using Institutional Characteristics and Enrollment components in Integrated Postsecondary Education Data System (IPEDS). Specifically, this group of institutions shared the racial demographic and selectivity of MSIs but were not officially categorized as funded MSIs in AY 2011-12.

field of credential production for MSIs and health science is the third highest field for non-MSIs. In the four-year sector, substantially more credentials were generated in the field of human services, while significantly fewer credentials were generated in the field of manufacturing.

Four-year HSIs once again dominate credential production in education and training among MSIs and are significant contributors across most fields. Notably, AANAPISIs (25.2 percent), ANNHs (20.2 percent) and HBCUs (18.9 percent) produce STEM credentials at rates above the MSI average of 18.8 percent. The relationship between type of credential (i.e., certificate, associate degree, and bachelor's degree) and field is quite consistent across MSIs and non-MSIs. Table 6 illustrates that while the top three fields vary slightly by credential type, within each credential type, MSIs and non-MSIs have very similar credential production patterns. What is more, the results show that credentials in the top three fields for each credential type dominate those in other fields: credentials in the top three fields represent more than half of those earned in all fields combined, across both MSIs and non-MSIs.

Table 6: Credential Production by Credential Type and Field Among Funded Two- and Four-Year MSIs and Non-MSIs

	Certificates		Associate Degrees		Bachelor's Degrees	
	MSIs	Non-MSIs	MSIs	Non-MSIs	MSIs	Non-MSIs
Arts, A/V Technology & communications	3.0%	2.5%	2.6%	2.2%	8.5%	7.9%
Business, management & administration	7.1%	6.9%	6.8%	7.0%	12.7%	13.9%
Education & training	19.9%	15.1%	48.1%	46.0%	17.0%	17.1%
Health science	24.4%	27.7%	14.4%	17.7%	8.5%	8.6%
Human services	4.6%	4.5%	2.5%	2.4%	10.1%	10.5%
Manufacturing	8.4%	10.5%	1.5%	2.0%	0.5%	0.4%
Marketing, sales & service	7.3%	5.9%	3.9%	4.2%	7.6%	7.2%
STEM	2.2%	2.0%	12.5%	10.1%	21.8%	21.3%
Transportation, distribution & logistics	8.7%	10.6%	0.9%	1.0%	0.1%	0.2%
Other fields (n = 8)	14.4%	14.3%	6.8%	7.4%	13.1%	12.8%

Note. Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), AY 2011-12, Institutional Characteristics component. The top three fields are highlighted for each credential type.

Our results reflect trends that one would expect are related to differences in fields across credential types. For example, the most certificates were produced in the field of health science, likely reflecting short- and longer-term certificates in programs such as home health and nursing, which are associated with positive labor market returns (Xu & Trimble, 2016) and are in high demand (Bureau of Labor Statistics, 2015). The most associate degrees were generated in the field of education and training at MSIs and non-MSIs alike and may reflect popular programs

with strong employment prospects, including early childhood education (U.S. Department of Education, 2016a). At the baccalaureate level, more than half of degrees conferred were in the fields of STEM; education and training; and business, management, and administration—popular programs nationwide at four-year colleges and universities (U.S. Department of Education, 2015b; Carnevale, Cheah, & Hanson, 2015).

3. Labor Market Alignment Analysis

Our degree production analysis suggests a concentration of postsecondary credentials in particular fields—business, management, and administration; education and training; health science; and STEM—in both MSIs and non-MSIs. To the extent this convergence aligns with labor market demand, it may reflect the responsiveness of postsecondary institutions to local industry and employment needs and is likely serving students well. However, if these fields do not align with labor market demand, industry and policy representatives may need to work more closely with system and institutional administrators to increase alignment and ensure that the pathway from postsecondary education to the labor market is more direct. We build on our previous analysis here and explore whether credential production was meeting concurrent labor market demand using a state-level case study method.

While postsecondary credentials hold power within the labor market, not all academic fields give students an equal chance at finding work. In some instances, choosing a program of study can be as critical as choosing whether to attend college. For example, the unemployment rate for recent college graduates was 7.5 percent in 2012. Yet just 5.1 percent of elementary education majors, 4.8 percent of nursing majors, and 4.5 percent of chemistry majors were unemployed after graduating, compared to over 10 percent of architecture and social science majors (Carnevale & Cheah, 2015). The high-demand fields aligned with the high concentration of credentials in education and training, health science, and STEM at both MSIs and non-MSIs uncovered in our analysis.

College academic programs affect not only students' employment prospects but their income as well. The difference in lifetime wages between high school and college graduates is one million dollars; the difference in lifetime wages between the lowest and highest paying college majors is 3.4 million dollars (Carnevale, Cheah, & Hanson, 2015). These disparities are costlier for students of color. Black students are overrepresented in four of the six lowest paying college majors; and Hispanic students are overrepresented in three of the six majors at the bottom of the income ladder (Allison, Mugglestone, & Foster, 2015; Carnevale, Fasules, Porter, & Landis-Santos, 2016). Such data suggest that the disconnect between postsecondary programs and labor market outcomes is more consequential for some students than others. In response, entities, including the Georgetown Center on Education and the Workforce and the Workforce Data Quality Campaign, have called for more transparency between postsecondary institutions and career pathways so that students fully understand the risks and rewards associated with their

choice of college and fields of study and can thus choose options that are more likely to produce a high return on their postsecondary education investment.

Labor market outcomes not only depend upon one's major or field of study, but also on locale. According to a 2015 report by the Georgetown Center on Education and the Workforce, college graduates have the best odds of finding a job in Massachusetts, Delaware, and Washington State, and they face the greatest challenges in West Virginia, Rhode Island, and South Carolina (Carnevale, Jayasundera, Repnikov, & Gulish, 2015). Hanson and Gulish (2016) found that millennials who grew up in small towns and were exposed to cities through college had to stay in the cities if they wanted jobs. As a result, millennials have urbanized at a greater rate than previous generations.

Sample and Method

The state-level case studies of credential and labor market alignment draw from data from Alabama and California. We selected these states because they reflect geographical variation in labor markets and are both home to large proportions of MSIs.

Alabama's labor market relies heavily on employees with lower levels of education. Nearly 42 percent of jobs in the state require a high school diploma or equivalent (Torpey & Watson, 2014).[6] By contrast, in California, over 20 percent of occupations require a bachelor's degree, surpassing the national average of 18 percent and positioning California in the top ten states with jobs requiring a bachelor's degree (Torpey & Watson, 2014). California boasts more industry enclaves with higher education requirements—such as the technology industry in Silicon Valley, the finance industry in San Francisco, and the entertainment industry in Los Angeles. Alabama, like many southern states, has attracted manufacturers in recent decades given lower operating and labor costs, among other factors (Kotkin & Shires, 2015). Labor markets in both states have improved considerably since the trough of the Great Recession. In July 2018, the preliminary unemployment rate in Alabama was 4.1 percent, slightly lower than California's unemployment rate of 4.2 percent. Labor market participation rates have rebounded as well and in July 2018 were 57.1 percent and 61.9 percent, respectively, in Alabama and California.

Alabama and California rank among the top ten states nationally with the most MSIs.[7] All of the MSIs in Alabama are HBCUs and PBIs, reflecting the racial makeup of the state, where a quarter of all residents are Black, as well as the state's history of educational segregation (U.S. Census Bureau, 2015). In California, HSIs and institutions with both HSI and AANAPISI designations represent over three quarters of all MSIs. Since 1970, the Hispanic population in California has grown from 12 percent to 40 percent (Panzar, 2015), and the proportion of

[6] Alabama ranked second nationally in jobs requiring a high school diploma or equivalent, behind Kentucky.
[7] The top ten states with the largest numbers of MSIs are: California (132), Texas (68), Puerto Rico (49), New York (29), New Mexico (27), Georgia (27), North Carolina (25), Illinois (22), Alabama (20), Florida (18).

Hispanics attending college in the state has increased significantly (Valliani, Siqueiros, Ryan, & Dow, 2015).

These state-level case studies draw on two sources of data. The first is our original IPEDS sample, which we used to establish the MSI contribution to the labor market "supply" side in AY 2011-12. Using data from IPEDS and OPE, our "eligible and funded" MSI sample was identified as outlined in the previous section. Using each institution's unique unit identification (ID) number designated by IPEDS, we extracted the MSI samples for Alabama and California. Alabama's MSI sample includes 15 HBCUs and 5 PBIs; 7 private four-year institutions; 4 public four-year institutions; and 9 public two-year institutions. California's MSI sample includes 60 HSIs, 41 institutions that share both AANAPISI and HSI designations, 27 AANAPISIs, 3 institutions that share both HSI and PBI designation, and 1 institution that shares both AANAPISI and PBI designation. There are 19 private four-year institutions; 21 public four-year institutions; 4 private two-year institutions; and 88 public two-year institutions.

Similarly, we used IPEDS unit ID numbers to identify all institutions in both Alabama and California that were not designated as eligible *and* funded MSIs for AY 2011-12 to create our non-MSI comparison sample. Alabama's non-MSI sample includes 41 institutions: 28 four-year institutions and 13 two-year institutions. California's non-MSI sample includes 178 institutions: 141 four-year institutions and 37 two-year institutions.

We used Perkins IV Crosswalks to map Classification of Instructional Programs (CIP) codes and Occupational Information Network (O*NET) Standard Occupational Classification (SOC) codes into career clusters. We used Alabama and California labor data to establish the labor market "demand" side. Specifically, we leveraged archived 2012 data from the Alabama Department of Labor to determine total employment by educational credential level in 2012 as well as the top five career fields (i.e., professional industry clusters) in 2012. Similarly, we pulled archived 2012 data from the U.S. Bureau of Labor Statistics, Occupational Employment Statistics, and the California Employment Development Department, Labor Market Information Division to determine total employment by educational credential level in 2012 as well as the top five career fields in 2012 for California. Notably, there are challenges associated with these state-level labor data that impact our analysis and the interpretations we can draw. The occupational codes (O*NET/SOC) and CIP codes are aligned using a Perkins IV crosswalk. However, inconsistencies across the codes, particularly revised CIP codes, make a precise alignment process difficult.

Our empirical approach attempts to draw *high-level* connections between credential production and labor market demand. Such an approach has limitations. For example, our analysis does not distinguish between the proportion of the labor market a field represents in a state and open positions in the field at any given time. Seemingly aligned credential production and labor markets may very well underestimate or overestimate job prospects. Future analyses should strive to account for the availability of employment in addition to career field alignment. Another limitation to this analysis is that a high percentage of graduates report employment in

jobs unrelated to their major or program (though type of credential seems more aligned) (Abel & Deitz, 2014). Given this tendency, misalignment found in our analysis would not necessarily be correlated with unemployment. Although beyond the scope of this analysis, it would be useful to examine the implications of such behaviors and the extent to which labor market characteristics, individual behaviors, or a combination of the two are driving this phenomenon.

Alabama Findings

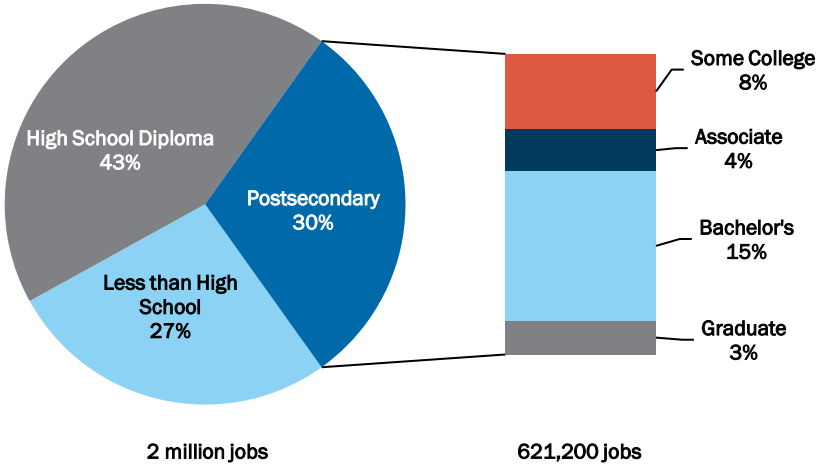
Alabama is home to 91 institutions of higher education, including 20 MSIs.[8] Fifteen of the 20 MSIs are HBCUs, including institutions such as Tuskegee University that have made indelible marks on this nation's history, and the remaining 5 are PBIs. These MSIs exist both alongside and within state public and community college systems and private colleges that enroll a combined 305,000 students (U.S. Department of Education, 2015b).[9] According to Lumina Foundation's 2016 *A Stronger Nation* report, 36.7 percent of Alabama's working age population have earned a quality postsecondary credential, up 5.1 percentage points since 2008 but below the national average of 45.3 percent.

In 2012, 30 percent of all jobs in Alabama, or approximately 621,000 positions, required postsecondary education. Figure 2 illustrates Alabama's employment by credential requirements and highlights the distribution of credentials for jobs that require postsecondary attainment. Of the 30 percent of total jobs that required a postsecondary credential, 15 percent of them required a bachelor's degree and 12 percent required sub-baccalaureate credentials (i.e., some college or an associate degree).

Three quarters of all jobs in Alabama in 2012 were clustered in five career fields: business, management, and administration; health science; hospitality and tourism; manufacturing; and education and training. In our sample, 63 percent of Alabama's total MSI credential production corresponded with the state's top five career fields. Credential production at Alabama MSIs was relatively well aligned with the labor market in the fields of health science; business, management, and administration; and manufacturing. However, the proportion of education and training credentials was larger than and the proportion of hospitality and tourism credentials was smaller than reflected in the concurrent labor market. Figures 3 and 4 present high-employment career fields and MSI credential production by career field in Alabama in 2012.

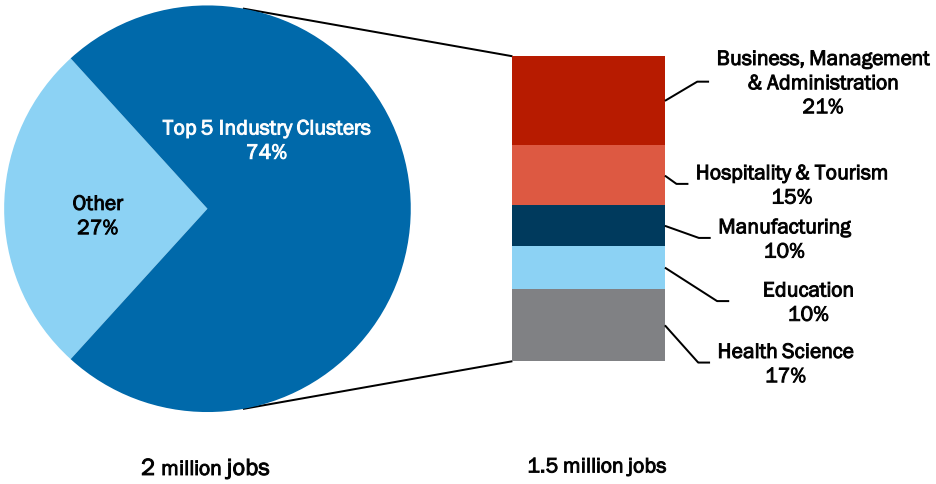
[8] This number includes public, private and for-profit two and four-year institutions.
[9] Of the 20 MSIs in Alabama, 7 are private four-year institutions; 4 are public four-year institutions; and 9 are public two-year institutions.

Figure 2: Alabama Employment by Credential, 2012



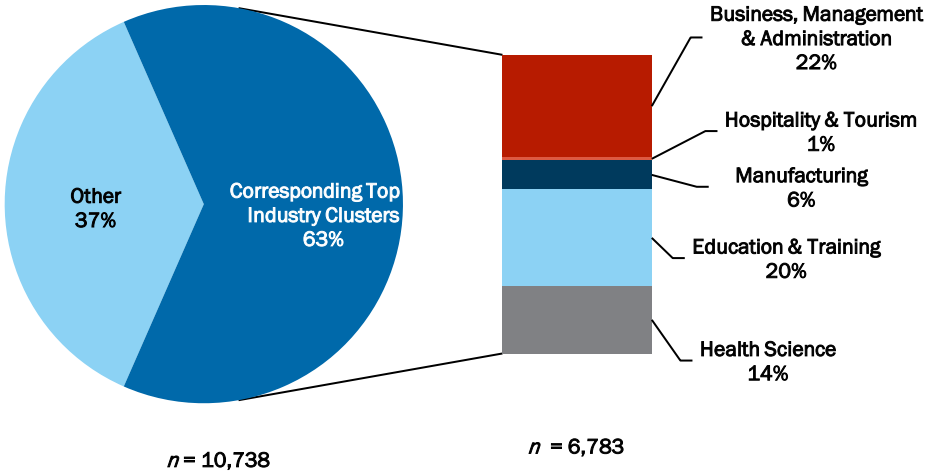
Source: Alabama Department of Labor.

Figure 3: Alabama Employment by Industry, 2012[a]



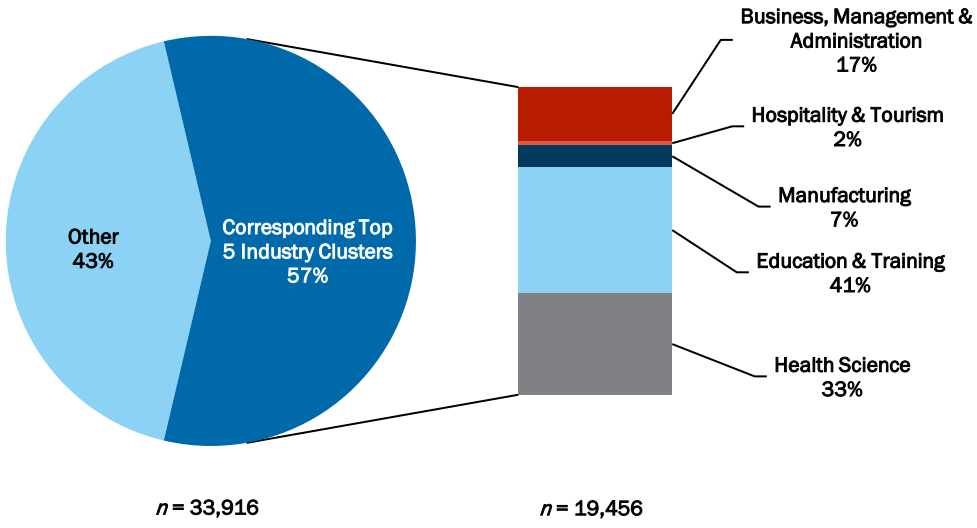
Source: Alabama Department of Labor.
[a]Labor market demand measures all jobs, not just jobs requiring postsecondary education.

Figure 4: Alabama MSI Credential Production by Industry, 2012



Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data. System (IPEDS), AY 2011-12, Institutional Characteristics component, and Alabama Department of Labor.

Figure 5: Alabama Non-MSI Credential Production by Industry, 2012



Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education. Data System (IPEDS), AY 2011-12, Institutional Characteristics component, and Alabama Department of Labor.

The alignment between credentials produced by career field and jobs in the labor market by industry was slightly stronger for MSIs than non-MSIs in our sample. Fifty-seven percent of credential production at non-MSIs aligned with Alabama's top five career fields (Figure 5).

Similar to MSIs, there was moderately strong alignment in health science; business, management, and administration; and manufacturing. Non-MSIs also produced more credentials in education and training and fewer credentials in hospitality and tourism than reflected by the labor market.

California Findings

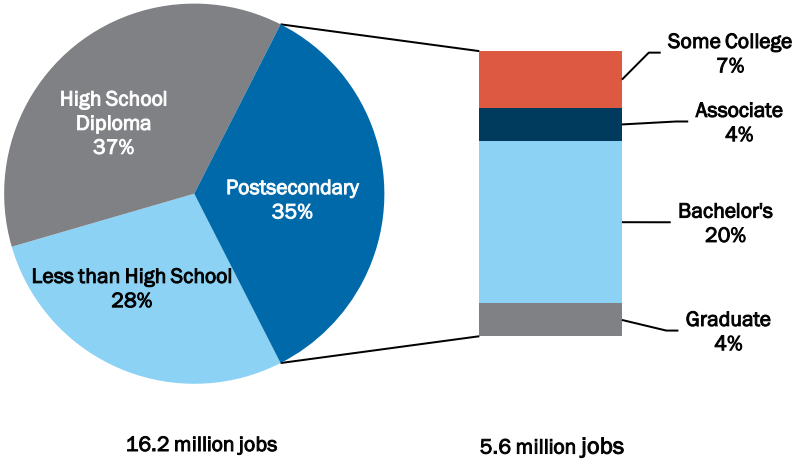
With three major public college systems—University of California (UC), California State University (CSU), and California Community Colleges—as well as private and for-profit institutions, there are nearly 500 higher education institutions in California, enrolling more than 2.8 million students (Community College League of California, 2016). With the largest concentration of MSIs in the nation, California is home to 132 MSIs, some of which rank among the most reputable institutions in the nation, including the University of Southern California.[10] Forty-seven percent of California's working age population has earned a postsecondary credential, surpassing the national average of 45.3 percent (Lumina Foundation, 2016).

In 2012, 35 percent of all jobs in California, or approximately 5.6 million positions, required postsecondary education. Figure 6 presents employment by credential requirements in California in 2012 and highlights the distribution of credentials for jobs that require postsecondary attainment. Of the 35 percent of jobs requiring a postsecondary credential, 20 percent required a bachelor's degree and 11 percent required sub-baccalaureate credentials (i.e., some college or an associate degree).

As was the case in Alabama, 75 percent of all jobs in California in 2012 were clustered in five career fields: transportation, distribution and logistics; hospitality and tourism; education and training; business, management, and administration; and health science. Our analysis finds that half of California's total MSI credential production in 2012 corresponded to the state's top five career fields. But notably, there was significant misalignment between the labor market and concurrent credential production. Transportation, distribution, and logistics comprised nearly a quarter of statewide employment in 2012 but was only 2 percent of total credential production at California MSIs. Likewise, 18 percent of jobs in the state were in hospitality and tourism, but just 1 percent of credentials earned at California MSIs were in this field. More than half of credentials earned by students attending California MSIs were in the field of education and training, which constituted about 15 percent of statewide employment. Figures 7 and 8 present high-employment career fields and MSI credential production by career fields in California in 2012.

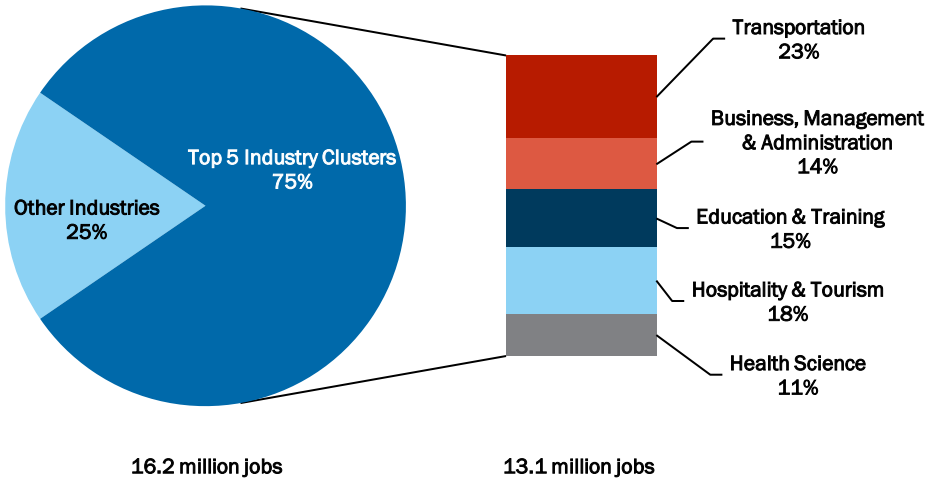
[10] Of California's 132 MSIs, there are 60 HSIs, 41 institutions that share both AANAPISI and HSI designations, 27 AANAPISIs, 3 institutions that share both HSI and PBI designation, and 1 institution that shares both AANAPISI and PBI designation. There are 19 private four-year institutions, 21 public four-year institutions, 4 private two-year institutions, and 88 public two-year institutions.

Figure 6: California Employment by Credential, 2012



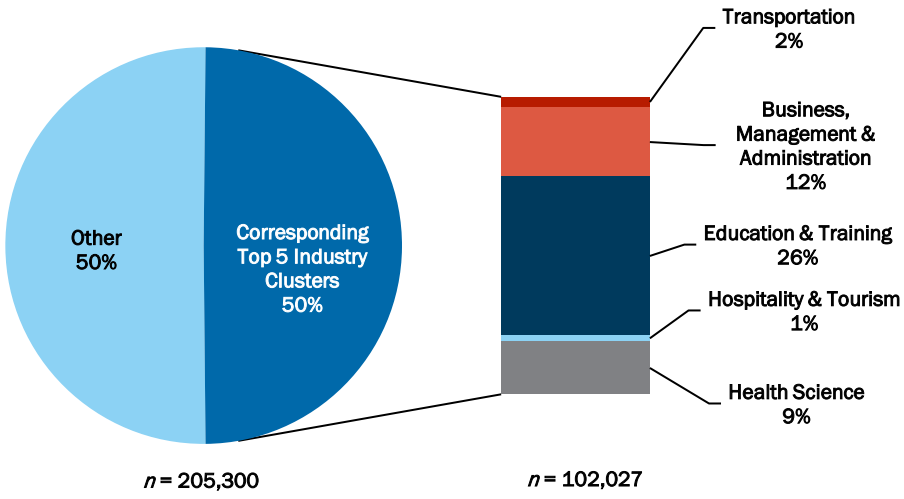
Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, and California Employment Development Department, Labor Market Information Division.

Figure 7: California Employment by Industry, 2012[a]



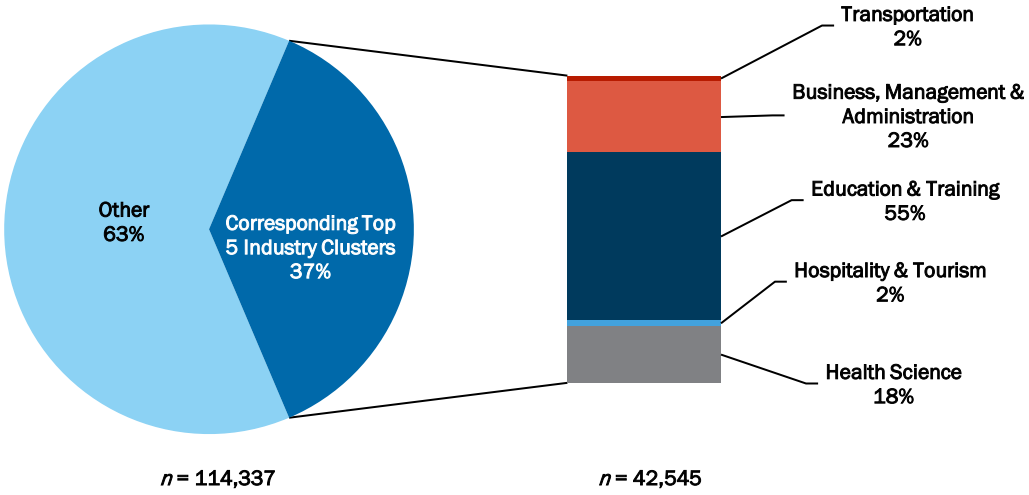
Source: California Employment Development Department, Labor Market Information Division.
[a]Employment by industry measures all jobs, not just jobs requiring postsecondary education.

Figure 8: California MSI Credential Production by Industry, 2012



Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), AY 2011-12, Institutional Characteristics component, and U.S. Bureau of Labor Statistics, Occupational Employment Statistics.

Figure 9: California Non-MSI Credential Production by Industry, 2012



Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), AY 2011-12, Institutional Characteristics component, and U.S. Bureau of Labor Statistics, Occupational Employment Statistics.

The alignment between credentials produced by career field and the labor market was stronger for MSIs than for non-MSIs in our California sample. Thirty-seven percent of credential production at non-MSIs aligned with California's top five career fields (Figure 8). Similar to MSIs, there were lower proportions of credentials produced in transportation, distribution, and logistics and in hospitality and tourism, and higher proportions of credentials produced in education and training relative to concurrent labor market employment in the state.

4. Research and Policy Implications

Rigorous research that more closely examines the relationship between credential production and the labor market than was undertaken in the current study will be necessary to measure and fully understand the differences between MSIs and non-MSIs. Nonetheless, the findings from our high-level analysis suggest that the differences may not be as stark as one might expect given the resource constraints that are likely impacting program of study availability and student services at MSIs. Important takeaways include that among two-year MSIs and non-MSIs in our sample, the most popular fields in which students earned credentials were education and training; health science; STEM; and business, management, and administration. In our comparison of four-year colleges, MSI and non-MSI fields were again the same, albeit with education and training topping the list, followed by business, management, and administration; STEM; and health science. We also found that field by credential type was dominated by a narrow set of fields with some but not substantial variation across credential types. For example, a higher proportion of certificates than other credentials were earned in the health and transportation fields; education credentials were concentrated at the associate degree level; and more business degrees were earned at the baccalaureate level than at the sub-baccalaureate level. In our state-level case studies, we saw stronger alignment between career fields and the concurrent labor market in Alabama than we did in California, suggesting that more attention to the transition from higher education to the workforce may be warranted in certain locales.

A weakness of this analysis is its focus on *the availability of programs and overall completion of credentials.* Future work must also consider *the quality of programs and their particular rates of completion and the employment patterns and earnings (including benefits) of students who complete programs of study*. How well are MSIs and non-MSIs graduating students in various programs of study? What institutional policies and practices are associated with higher-quality program outcomes? How can all institutions counsel more underrepresented students of color into degree programs with higher labor market returns? What can we learn from impactful institutional policies and practices to develop or refine more effective state and federal policy, for MSIs in particular?

The pursuit of answers to these first three questions is well underway (Gasman & Conrad, 2013; Flores & Park, 2014; Carnevale, Fasules, Porter, & Landis-Santos, 2016) but will

require the engagement of a broader swath of researchers using a mix of quantitative and qualitative methodologies across large samples of institutions. Importantly, it will need to involve more scholars at minority-serving institutions who can speak with authority on facilitators and inhibitors of student success. Better information on the outcomes of students at MSIs and on the institutional backdrops becomes the backbone of stronger, evidence-based state and federal policy. Right now, for example, it is not clear which U.S. Department of Education OPE Institutional Service programs and activities are generating significantly better student outcomes. We must learn more and consider increased investments in proven areas. As studies on adequacy funding in the K-12 system have long established (Baker, Farrie, & Sciarra, 2016), under-resourced institutions, like MSIs and community colleges, that serve disproportionate numbers of academically underprepared, first-generation, low-income students require more funding per FTE, not less (Kahlenberg, 2015), targeted to the policies and practices that drive better student outcomes.

As the research is ongoing, there are promising reform efforts taking place at higher education institutions that policymakers with MSI oversight should be closely monitoring—as they could very well have bearing on students' decisions about career fields, likelihood of completion, and employment prospects. One such reform is guided pathways (Bailey, Jaggars, & Jenkins, 2015), which hypothesizes that students are more likely to complete a credential "in a timely fashion if they choose a program and develop an academic plan early on, have a clear road map of the courses they need to take to complete a credential, and receive guidance and support to help them stay on plan" (Bailey, Jaggars, & Jenkins, 2016, p. 1). This initiative requires colleges to develop highly structured and coherent programs of study and sustained support services to guide students into and through the pathways. A national guided pathways network and several state demonstration projects are underway and should be generating information about students' educational outcomes in the near future.[11]

The relationship between jobs and credentials examined in this paper also calls attention to the utility of some level of gainful employment oversight by federal and state agencies. Gainful employment regulations were enacted to protect students from predatory and underperforming career college programs. They tied an institution's eligibility to receive federal financial aid dollars to students' employment outcomes (pegged to reasonable loan repayment levels) and had their most significant effects on for-profit institutions.[12] An important component of the regulations requires institutions to report information on the cost of their various programs to the students, completion rates, labor market earnings, and debt accumulation. Viewed from the lens of accountability, the requirements to gather and report this information may seem onerous. But from an institutional improvement perspective, these data could be actionable resources for

[11] Thirty institutions from 17 states are participating in the American Association of Community Colleges Pathways Project (http://www.aacc.nche.edu/Resources/aaccprograms/pathways/Pages/default.aspx), and state-level guided pathways reforms are underway in Ohio and Washington.

[12] Gainful employment regulations were released by the Obama administration in 2011 and were subject to unsuccessful legal appeals by the for-profit college industry (U.S. Department of Education, 2015a).

strengthening institutional capacity and improving students' academic and labor market outcomes. Critically, insights drawn from these data could inform policy and practice to address the factors that seem to be steering students of color into fields that pay lower wages.

Much can be learned from research on MSIs and on other colleges and universities that can be used to build the institutional capacity of MSIs, improve their performance, and position the significant numbers of students of color who attend these institutions for economic success and productive citizenship. Translating what we learn into constructive, evidenced-based federal, state, and institutional policy and practice is no small task—but it is vital if we are to disrupt the reproduction of inequality attributed to our educational systems (Century Foundation, 2013). It will require more resources to address basic adequacy funding issues and more strategic investment to ensure impact. It also will require more transparency at every level so we can identify and learn from institutional innovators, scale promising processes across institutions, redistribute resources from less effective to more effective policies and practices, and rigorously measure the effects of such actions on students' academic and employment outcomes.

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