In-State Employment Outcomes for Graduates from Missouri's Public Higher Education Institutions: Wage Premiums by Degree Level and Field of Study

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This report is one of several sets of analyses undertaken as part of Missouri's Workforce Data Quality Initiative, a project funded by the U.S. Department of Labor through the Missouri Department of Economic Development (DED). The analysis described herein was undertaken pursuant to a subcontract between the DED and the Department of Economics at the University of Missouri-Columbia.

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Introduction

States' investments in both their K-12 and higher education systems represent key mechanisms for developing the human capital that comprises their work forces. Research consistently shows that employment and earnings for individuals are related to their educational attainment and that aggregate economic measures for states vary with the overall educational attainment of their citizens. This report from the Missouri Workforce Data Quality Initiative (WDQI) uses Missouri data about public higher education participation and completion and wage data from the state's unemployment insurance system to examine the in-state employment status and first year earnings of students who graduated from a public college or university between summer 2006 and spring 2011.

The analyses in this report indicate that the level of attainment matters, with higher attainment associated with higher earnings in the first year after graduating from college. Consistent with other research (e.g., Baum, 2014; Carnevale, 2013; Schneider, 2012), field of study also contributes to wage premiums, with graduates from programs related to science, technology, engineering and mathematics (STEM fields) generally enjoying higher wages than graduates who earned degrees in other disciplines. The institution from which individuals graduated also matters, with graduates from more selective institutions earning more than graduates with equivalent degrees from less selective institutions. However, this selectivity premium is only observed among graduates majoring in STEM fields.

The influence of the 2008 recession also is evident in the results: graduates in 2008 earned, on average less than $500 more than graduates in 2007, while graduates in 2009 through 2011 earned $500 to $1150 less than those who graduated in 2007. Graduates from 2010 showed the largest relative decline in earnings. A final analysis estimates wage premiums for various types of degrees from institutions with differing levels of selectivity after controlling for age, gender, race, and college GPA. Compared to non-STEM certificate earners, wage premiums vary from a high of nearly $45,000 per year for graduates of professional STEM programs to a low of -$230 for graduates from non-stem associate degree programs.

Data

The WDQI project assigned a common unique ID to records about individuals collected by several different state agencies. After assigning the new IDs to the records, names and other data elements that could be used to identify the individuals in the records were removed. De-identified records were used to conduct the analyses summarized in this report.[1]

All completion records from the Missouri Department of Higher Education (DHE) were analyzed to identify the last degree or certificate associated with each unique ID. There were more than 169,000 individuals who earned at least one credential from a pubic college or university between 2006 and 2011. College enrollment records were checked for all graduates and those who were still enrolled in college after earning their last credential were omitted from the group matched to wage data.[2] A total

[1] A detailed description of data preparation steps, logic, and results are presented in Appendix C. This includes rules used to group completions into STEM categories and rules used to summarize wage records.

[2] Removing graduates still in college eliminates that part of the graduate population that may not be pursuing full-time employment because they still are in school and allows estimating wage premiums by degree level without the potential influence of improved human capital from further college education which may or may not lead to

of just over 147,000 individuals who received a degree or certificate from a Missouri public college or university were available to match to Missouri wage data.

Employment and earnings were determined for each graduate by examining the unemployment insurance earnings records for the four quarters following their last graduation date. Students who graduated in the spring semester (quarter 2) were matched to earnings data for quarters 3 and 4 of the same calendar year and quarters 1 and 2 of the following academic year. Those who graduated in a fall semester were matched to earnings for all four quarters of the calendar year following their graduation. Graduates from summer sessions were matched to earnings records from quarter 4 of the year they graduated and quarters 1 to 3 of the calendar year after their graduation date.

Results

Five primary analyses were completed to answer questions about employment and wages for public higher education graduates working in Missouri and the results of each analysis are discussed in a separate section. The key question addressed by each analysis is presented and, where appropriate, relevant rules for filtering completions and/or wage records are summarized. Results include descriptive statistics (counts, percentages, means and medians) that provide useful information about overall employment rates and Missouri earnings for graduates from public colleges and universities. The culminating analysis uses a multiple regression model to estimate the Missouri wage premiums to different types of degrees earned from different types of institutions.

Analysis 1: Graduates, Employment, and Earning by Degree Level

Table 1 presents the total number of final completions observed for graduates from public institutions by degree level along with results from data filtering and matching to wage records. Those whose last degree was a bachelor's degree account for just over half of the individuals who graduated from a public college or university in Missouri, while just under one fourth of the graduates last earned an associate's degree. Table A1 in Appendix A presents data by year and shows that there were more graduates in 2010 and 2011 in each degree level than there were in 2007 through 2009 which is consistent with other research which shows that higher education enrollments (and completions) increase when economic conditions worsen. It is likely that the recession which began in 2008 contributed to increasing enrollments in Missouri's public higher education institutions which then contributed to increases in completions in subsequent years.

The percent of graduates not observed continuing in public higher education over the same period ranged from a low of just under 70% for those whose last degree was a certificate to nearly 100% for those earning a professional or doctorate degree. Those rates were relatively stable for all but those whose last completion was a certificate, where the share available to match to wage data in later years was generally lower than earlier years. This lower availability in later years suggests that certificates, especially graduate certificates, may be viewed as an "interim" credential by many college students and a way to accumulate credentials en route to a traditional degree. It also may reflect more challenging labor market conditions during the recession, when newly minted certificate holders had more difficulty competing for jobs with recent graduates who were completing more long-term degrees. Perhaps more certificate holders were unable to find work with only a certificate and chose to remain in higher education to pursue additional degrees.

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additional credentials. Note that graduates who enrolled in private colleges or out-of-state institutions may have been retained in the group of graduates considered available to the labor market.

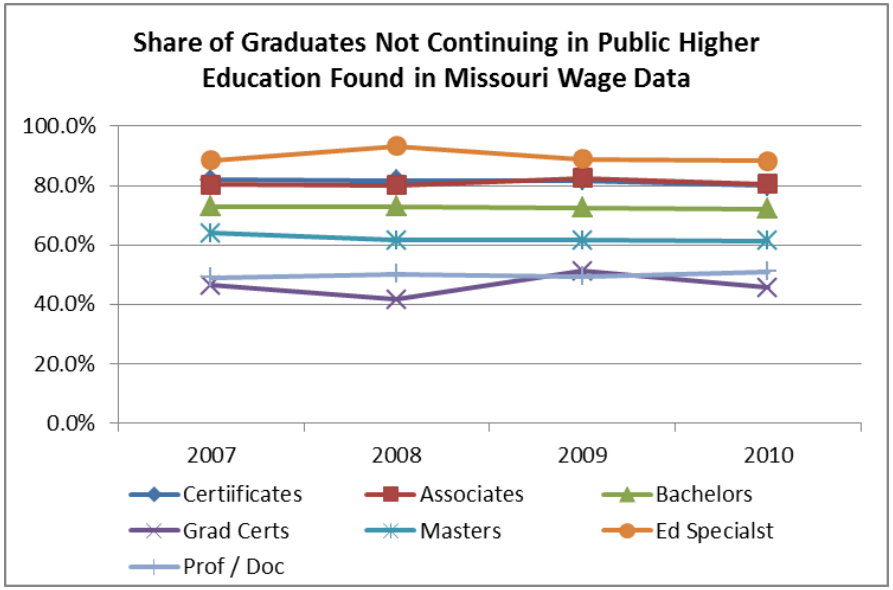
Table 1: Public Higher Education Completions Between 2007 and 2011 by Degree Level and Results from Matching to Missouri Wage Data

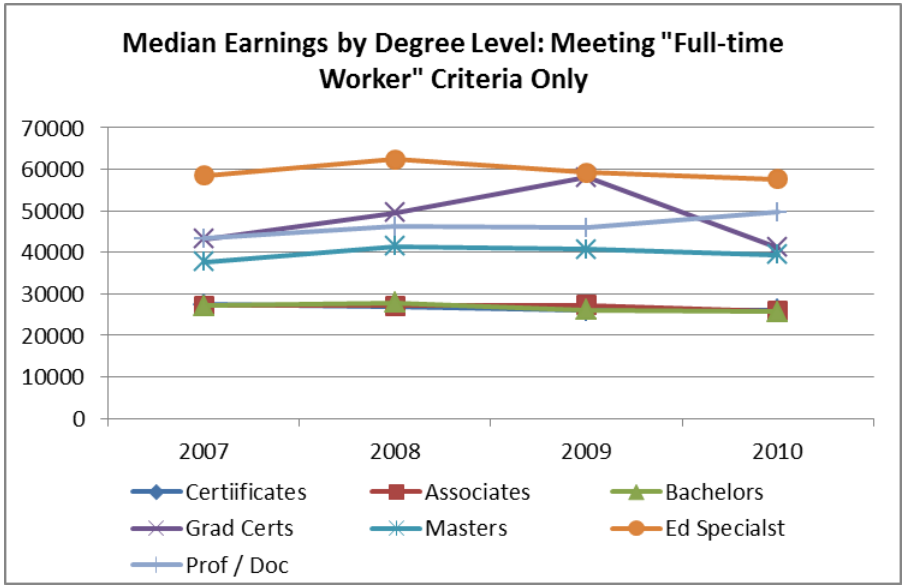
Degree Level	# Degrees	# Not in College[a]	% Avail for Matching	# In Wage Data	% in Wage Data	Average Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Average Wage ($$)	Median Wage ($$)
Certificates	7,167	4,873	68.0%	3,917	80.4%	22,626	20,422	2,747	56.4%	29,666	26,119
Associates	40,221	31,762	79.0%	25,489	80.2%	19,653	15,962	15,131	47.6%	29,079	25,483
Bachelors	85,728	77,146	90.0%	55,380	71.8%	20,308	17,726	35,187	45.6%	28,749	25,640
Grad Certs	778	536	68.9%	253	47.2%	41,627	32,789	198	36.9%	49,293	40,707
Masters	27,670	25,461	92.0%	15,488	60.8%	36,469	35,484	13,007	51.1%	42,179	38,723
Ed Spec	1,108	965	87.1%	866	89.7%	56,705	55,972	843	87.4%	58,134	56,638
Prof / Doc	6,462	6,353	98.3%	3,170	49.9%	46,234	40,884	2,652	41.7%	53,916	44,631
Unknown	114	95	83.3%	82	86.3%	28,310	32,487	70	73.7%	31,960	34,199
TOTALS	169,248	147,191	87.0%	104,645	71.1%			69,835	47.4%		

[a] Not in a public Missouri college or university

[b] In 4 consecutive quarters after graduation with annual earnings between $14000 and $499,999

Figure 1: Percent of Available Graduates Found in Missouri Wage Data and Median Earnings of those Matched: by Degree Level and Year





The first chart in Figure 1 presents the percent of graduates found in Missouri wage data for each degree level from 2007 through 2010.[3] The share of available graduates found working in Missouri varied from just under 50% for those who last earned a graduate certificate or a professional or doctoral degree to nearly 90% for those who earned an Educational Specialist degree. These "employment rates" were surprisingly stable over the four year period as indicated by the relative flatness of the lines. Generally, about 80% of certificate and associate degree earners who were available to the job market found work in Missouri and about 70% of those who earned a bachelor's degree were observed working in the state. The lower rates for those with higher degrees most likely reflect increased mobility of higher attaining graduates who seek and accept employment in other states.

The second set of results presented in Table 1 provides some information about potential underemployment of Missouri's college graduates. The first set of employment and earnings data in Table 1 report statistics for those graduates that were matched to wage records any time in the first year after graduation, regardless of the number of quarters they were observed or their level of earnings. The second set of wage match results are for only those graduates who appeared in the wage records all four quarters after their completion and where the cumulative wages over those four quarters was at least $14,000. The intent of this filtering was to identify the graduates who could be considered continuous full-time workers. There are substantial gaps between the percent of graduates found in wage data when no restrictions were applied and the percent when full-time worker restrictions were applied. A full third of associate degree graduates and approximately one in four certificate and bachelor degree graduates were omitted from average and median wage calculations when the full-time worker criteria were applied to the matching results. This indicates that a substantial share of graduates either found it difficult to find jobs, hold jobs, and/or worked less than full-time during the year immediately following graduation. While some of the graduate credential earners did not meet the full-time worker conditions, the percentages were much lower, with only about 10% of graduate certificate or master degree recipients and 8% of those earning doctorate or professional degrees excluded for failing to meet the criteria. Examining the detailed data in Table A1 indicates that the gap between any work and full-time work grew by six to seven percentage points between 2007 and 2010 for undergraduate credential earners, but was virtually unchanged for those earning graduate credentials. This is consistent with national findings reported by the US Department of Education indicating that 2008 graduates of undergraduate programs had more difficulty securing full-time employment during the recession than graduates from earlier decades (Staklis, Skomsvold, and Soldner, 2014).

The second panel in Figure 1 presents median wages by degree level for Missouri's graduates who were observed working in the state and whose earnings met the minimum criteria for consideration as a full-time worker in the year following their last completion. The highest median earnings were for those whose last degree was an Educational Specialist degree, which reflects the unique nature of this credential and the individuals who pursue it. Generally, these individuals are working professionals who complete this degree on a part-time basis to meet requirements for jobs as school administrators. They are full-time professionals before and after degree completion with relatively high salaries.

Of particular note in the chart are the trends in median earnings for graduates with less than graduate credentials. There is little difference in the median earnings of those whose last degree was a certificate, associate's degree, or bachelor's degree with median earnings for all three degree levels between $28,000 and $29,000 for 2010 graduates. It also is interesting that the median first year earnings have consistently declined

[3] Earnings and employment statistics shown in Table 1 include 2011 graduates but results for 2011 graduates are not included in charts of trends because wage data needed to match four successive quarters for spring and summer 2011 graduates were not part of the data pull for the WDQI project.

from 2007 to 2010 for all three degree levels, reflecting the economic contraction that accompanied the 2008 recession. Note also in Table 1 that the mean and median earnings of this subgroup of graduates who were matched in the wage data are much higher than the comparable earnings statistics when the full-time worker restrictions were not applied. The increase in median earnings varied from $6,000 for certificate earners to almost $10,000 for associate degree earners. Those who earned bachelor degrees and met the full-time worker criteria had median wages approximately $8,000 higher than working bachelor degree recipients who did not meet the full criteria.

The relative positioning of the other post baccalaureate degree levels in the chart indicates larger wage premiums for attainment of increasingly higher levels of graduate education, and, while there was some downward pressure on wages observed for these graduates during the period, the effects appear to be somewhat lower which will tend to widen the gap in earnings for those with graduate versus undergraduate degrees.

Analysis 2: Graduates, Employment, and Earning by Degree Level and Major

Academic majors for the college completions data included in the WDQI project were coded using the Classification of Instructional Programs (CIP). All completions were combined across years and Figure 2 presents both the percentage of all graduates in each degree level that are accounted for by the top majors and the employment outcomes for both graduates from those majors and graduates from all other majors. Table 2 identifies by degree level the most frequent majors by 2-digit CIP code and program description and then presents the counts, match rates, and earnings data for both the most frequent majors and all graduates in other majors.

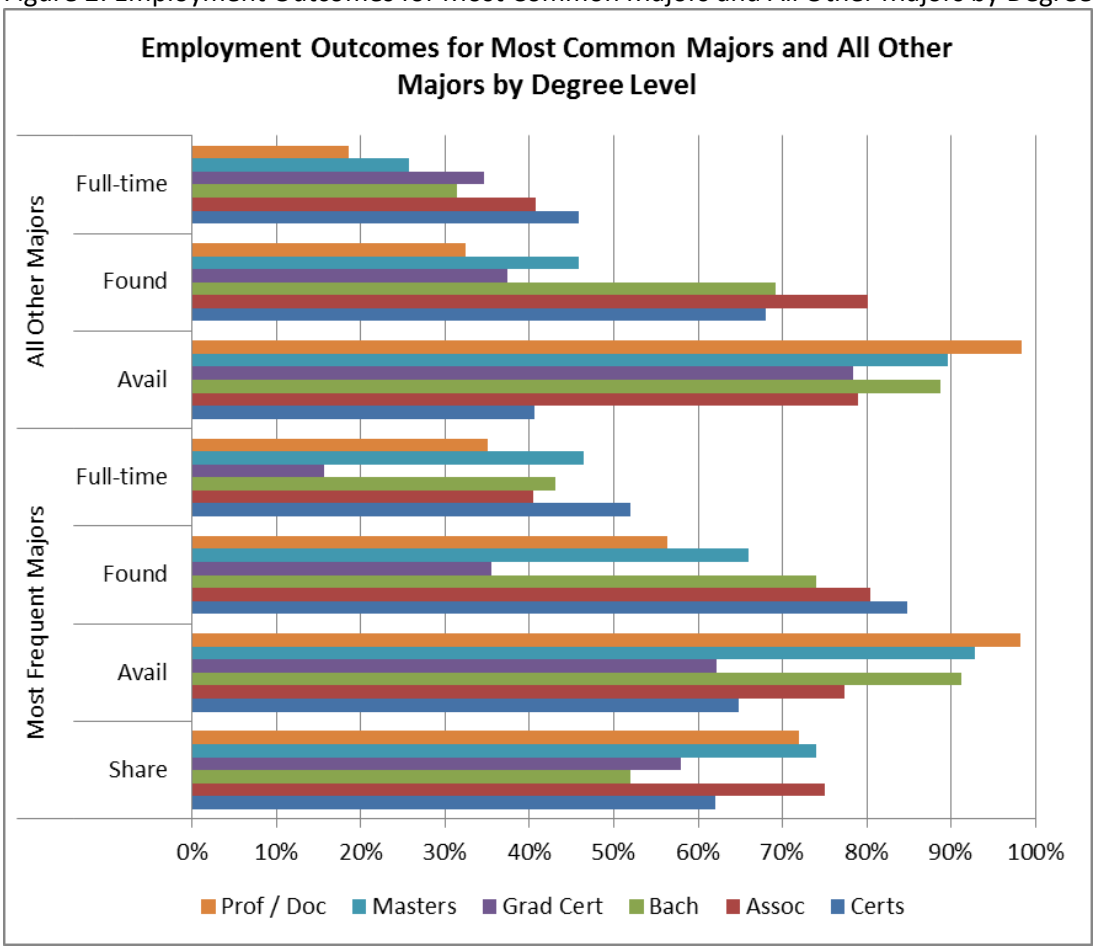
Undergraduate Certificate Graduates

Just over 60% of all graduates whose last credential was an undergraduate certificate completed one of the top three majors with health professions accounting for 37% of all certificate graduates between 2007 and 2011. Certificate earners in health professions were more likely to be enrolled in a public college after graduating than graduates from the other top majors, but the most popular certificate majors all had larger percentages available to match to wage data than certificate earners from the "all other majors" category where only 41% of graduates were available to match to wage data. The percent of graduates from the more common majors were found working in Missouri at higher rates and were more likely to meet the "full-time worker criteria" than certificate earners from all other majors. Median wages for certificate level graduates in the top three majors who met the wage criteria ranged between $26,600 for Security and Protective Services graduates to more than $34,000 for graduates from Engineering related fields.

Associate Degree Graduates

The general Liberal Arts and Sciences major is the top major for associated degree earners between 2007 and 2011 and accounted for more than half of all associate degrees earned. Other majors in the top three for associate degree graduates were related to Health Professions (18% of total) and Business (about 6% of total). Combined, the top three majors accounted for 75% of all associate degree graduates. More of the Liberal Arts and Sciences majors continued their college enrollment than other majors, which is not surprising, but still nearly 75% of those graduates were not observed enrolled in a public Missouri institution after they graduated. The percent of general associate degree earners found working in Missouri was a bit lower than the rate for graduates from any other majors, including those from the "all other majors" category. Associate degree graduates with majors related to Health Professions were more likely to be found working in Missouri and significantly more likely to meet the full-time worker criteria than any other associate degree graduates, and the median earnings of those working full-time was more than $16,000 higher than first year earnings observed for associate degree graduates from other majors.

Figure 2: Employment Outcomes for Most Common Majors and All Other Majors by Degree Level



Bachelor Degree Graduates

More than 85,000 individuals earned a bachelor's degree from a public Missouri college or university between 2007 and 2011. The five most popular majors accounted for just over 50% of all those bachelor degree graduates, with just over one in every five bachelor degree recipients majoring in Business. All but one of the most frequent baccalaureate majors are in fields other than general liberal arts which suggests that linking education to career aspirations is important to students' choices of a program of study, though the percentage of graduates from the top five programs no longer observed in college is not much higher than the rate for graduates from all other programs. The share of graduates from the top five programs found working was slightly higher than the share for all other majors though the percent that met the full-time worker criteria was nearly 10 percentage points higher than the graduates from other programs. Graduates with Education and Health Professions degrees had the highest percentages meeting full-time worker status while those with Communications and Engineering degrees were slightly less likely than graduates from all other majors to meet the wage criteria. The median first year earnings for graduates working "full-time" with degrees in Engineering were the highest at more than $50,000 followed by graduates from Health Professions degrees at just over $43,000. Median full-time earnings for Education graduates were just below median earnings for Business graduates, and about the same as the median earnings for graduates from the all other majors category.

Table 2: Most Frequent Majors of Graduates from Public Higher Education by Degree Level with Results from Matching to Missouri Wage Data

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not in HE[a]	% of Grads not in HE	# of Grads Found in MO Wages	% Found in MO Wages	Avg Wage ($$)	50th %tile Wage	# Meet Wage Rule[b]	% Meet Wage Rule	Avg Wage ($$)	50th %tile Wage ($$)
Certificates												
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	2,646	1,550	59%	1,322	85%	22,966	22,457	814	53%	30,160	28,566
43	SECURITY AND PROTECTIVE SERVICES	1,027	758	74%	694	92%	21,582	20,644	420	55%	28,479	26,618
15	ENGINEERING TECHNOLOGIES/TECHNICIANS	792	586	74%	438	75%	28,447	21,870	268	46%	40,403	34,349
--	ALL OTHER MAJORS	2,702	1,979	41%	1,391	70%	---	---	732	37%	---	---
Total Certificates		**7,167**	**4,873**	**68%**	**3,845**	**79%**	**22,626**	**20,422**	**2234**	**46%**	**31,327**	**28,012**
Associates Degrees												
24	LIBERAL ARTS AND SCIENCES, GENERAL STUDIES AND HUMANITIES	21,014	15,358	73%	11,795	77%	13,882	10,758	4644	30%	24,908	21,082
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	7,121	6,350	89%	5,676	89%	31,925	33,428	4044	64%	38,543	38,648
52	BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES	2,302	1,854	81%	1,490	80%	18,628	16,543	844	46%	26,332	22,481
--	ALL OTHER MAJORS	9,784	8,200	84%	6,507	79%	---	---	3,424	42%	---	---
Total Associates Degrees		**40,221**	**31,762**	**79%**	**25,468**	**80%**	**19,653**	**15,962**	**12956**	**41%**	**30,468**	**27,291**
Bachelors Degrees												
52	BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES	17,804	16,471	93%	12,442	76%	22,168	20,998	7184	44%	30,708	28,751
13	EDUCATION	9,746	8,555	88%	7,371	86%	19,974	18,722	4548	53%	26,981	27,279

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CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not in HE[a]	% of Grads not in HE	# of Grads Found in MO Wages	% Found in MO Wages	Avg Wage ($$)	50th %tile Wage	# Meet Wage Rule[b]	% Meet Wage Rule	Avg Wage ($$)	50th %tile Wage ($$)
09	COMMUNICATION, JOURNALISM, AND RELATED PROGRAMS	6,388	6,018	94%	3,873	64%	15,316	14,138	1711	28%	24,892	23,544
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	6,062	5,455	90%	4,405	81%	34,459	38,173	2915	53%	44,379	43,224
14	ENGINEERING	4,921	4,446	90%	2,232	50%	34,395	37,103	1300	29%	48,839	50,265
--	ALL OTHER MAJORS	40,807	36,201	89%	25,027	69%			11,367	31%		
Total Bachelors Degrees		**85,728**	**77,146**	**90%**	**55,350**	**72%**	**20,308**	**17,726**	**29025**	**38%**	**30510**	**27764**
Graduates Certificates												
14	ENGINEERING	237	132	56%	29	22%	70,774	70,581	18	14%	90,069	85,458
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	162	124	77%	62	50%	53,487	32,957	24	19%	88,594	79,481
15	ENGINEERING TECHNOLOGIES/TECHNICIANS	55	26	47%	9	35%	41,983	33,099	NR	NR	NR	NR
--	ALL OTHER MAJORS	324	254	78%	95	37%	---	---	88	35%	---	---
Total Graduates Certificates		**778**	**536**	**69%**	**195**	**36%**	**41,627**	**32,789**	**132**	**25%**	**58,449**	**46,182**
Masters Degrees												
13	EDUCATION	8,552	7,551	88%	5,799	77%	33,484	35,701	4200	56%	40,050	39,442
52	BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES	5,219	5,085	97%	3,271	64%	41,925	38,760	2175	43%	52,160	45,027
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	2,447	2,378	97%	1,662	70%	50,646	48,078	1235	52%	59,650	56,040
14	ENGINEERING	2,292	2,107	92%	419	20%	55,396	57,128	292	14%	70,231	66,554
44	PUBLIC ADMINISTRATION AND SOCIAL SERVICES	1,853	1,790	97%	1,330	74%	28,759	29,801	888	50%	36,549	34,123

Table 2: Most Frequent Majors of Graduates from Public Higher Education by Degree Level with Results from Matching to Missouri Wage Data

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not in HE[a]	% of Grads not in HE	# of Grads Found in MO Wages	% Found in MO Wages	Avg Wage ($$)	50th %tile Wage	# Meet Wage Rule[b]	% Meet Wage Rule	Avg Wage ($$)	50th %tile Wage ($$)
--	ALL OTHER MAJORS	7,307	6,550	90%	3,000	46%			1,683	26%		
Total Masters Degrees		**27,670**	**25,461**	**92%**	**15,481**	**61%**	**36,469**	**35,484**	**10,473**	**41%**	**45,909**	**41,429**
Education Specialist												
13	EDUCATION	1,060	921	87%	827	90%	57,007	56,271	676	73%	62,685	60,218
42	PSYCHOLOGY	40	36	90%	31	86%	50,314	50,459	25	69%	57,096	53,724
25	LIBRARY SCIENCE	8	8	100%	NR	NR	50,264	55,074	NR	NR	56,844	56,573
Total Education Special		**1,108**	**965**	**87%**	**858**	**89%**	**56,705**	**55,972**	**708**	**73%**	**62,430**	**59,834**
Doctorate or Professional Degrees												
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	2,674	2,635	99%	1,283	49%	58,402	45,787	883	34%	72,218	56,960
22	LEGAL PROFESSIONS AND STUDIES	1,458	1,435	98%	937	65%	32,091	27,670	444	31%	48,529	40,325
13	EDUCATION	550	532	97%	371	70%	59,180	58,927	286	54%	69,317	66,560
--	ALL OTHER MAJORS	1,780	1,751	98%	567	32%	---	---	324	19%	---	---
Total Doctorate or Professional Degrees		**6,462**	**6,353**	**98%**	**3,158**	**50%**	**46,234**	**40,884**	**1937**	**30.5%**	**62,480**	**51,228**
Miscellaneous												
13	EDUCATION	93	78	84%	NR	HIGH	28,628	32,487	NR	HIGH	34,641	35,012
45	SOCIAL SCIENCES	21	17	81%	6	35%	24,276	32,957	4	24%	35,866	34,930
TOTALS		**169,134**	**147,096**	**87%**	**104,355**	**71%**	**---**	**---**	**57,415**	**39%**	**---**	**---**

[a] Not in a public Missouri college or university

[b] In 4 consecutive quarters after graduation with annual earnings between $14,000 and $499,999

NR and HIGH indicate results were suppressed due to small number of observations or too few unknown cases.

Graduate Certificate Graduates

Less than 1,000 graduate certificates were awarded between 2007 and 2011 and the top three majors were related to Engineering or Health Professions; those 3 majors accounted for just under 60% of all individuals with graduate certificates as their highest level of completion. Those with Engineering-related certificates were more likely to continue college after receiving their credential and relatively low percentages of the graduates had first year earnings that met the wage criteria for full-time employment. Graduate certificate earners from the two programs with large enough numbers to report were quite high with median earnings approaching six figures and the advantage over all other graduate certificate majors was between $33,000 and $39,000. The high median wage levels for graduates with Engineering-related majors who meet wage criteria and the relatively large gap between the share observed in any employment and the share meeting wage criteria suggests that graduate certificate earners may be continuing their graduate education in private institutions where their college enrollment cannot be observed.

Master Degree Graduates

The top 5 programs account for nearly 75% of all master's degrees earned between 2007 and 2011. Not surprisingly, Education is the most frequent major for master's degree graduates, with Business related majors the second most frequent major. Education majors are slightly more likely to continue their college education after receiving their master's degree than master's degree recipients in other fields. Overall employment rates and the percentage of graduates meeting the full-time earnings criteria are higher for Education graduates than any other major. Only 20% of Engineering master's degree recipients were matched in Missouri wage data, a rate much lower than any of the other top majors, and more than 25 percentage points lower than master's degree graduates from the all other majors category. Median wages for master's graduates with Education majors are higher than median wages for master's graduates with Public Administration majors. Earnings for master's degree graduates from both these programs are between $6,000 and $20,000 lower than the median earnings of master's degree graduates from the other top majors but similar to earnings of master's degree graduates from the all other majors category.

Professional and Doctoral Degree Graduates

Nearly two in three degrees at this level were for Medical or Law degrees with Education rounding out the top three fields of study and bringing the share accounted for by the top three programs to over 70%. Almost none of these graduates was observed continuing enrollment in a public higher education institution, as these are considered "terminal degrees." The shares of graduates from the top three majors found working in Missouri were higher than the percentage from the all other majors group and those with Education doctorates were the most likely to be found employed in the state. Only half of those with medical degrees were found working in Missouri; this reflects the fact that many medical school graduates accept residency placements in other states. Nearly two-thirds of Law degree recipients were found employed in Missouri, but only about one in three graduates from either Law or Medicine professional programs met the full-time worker criteria. Somewhat surprising is the observation that, of those meeting the wage criteria, median earnings of those receiving Education doctorates were higher than median earnings of graduates earning professional doctorates, though this is partially explained by the relatively low earnings of medical students completing residency requirements.

Summary

At nearly all degree levels, the most popular majors, i.e., the majors with the most graduates, had names that suggest a defined career orientation, such as Business, Health Professions, Education, or Engineering. Generally, individuals with credentials in the more popular majors were also somewhat more likely to be found working in Missouri, and of those found, were more likely to meet the wage criteria for full-time employment. Variation in median earnings across majors for those meeting wage criteria were generally in line with popular

expectations, though some findings of relatively low earnings and/or employment rates for those with higher level Engineering-related and professional degrees was somewhat surprising.

Analysis 3: Graduates, Employment, and Earning by Degree Level and STEM Focus

The prior analysis examined employment and earnings outcomes for graduates based on major. An alternative way to group graduates is to organize them into broad categories that are considered STEM fields. Rather than group majors into one large STEM category, selected CIP codes were assigned to one of five stem areas. Table 3 presents the 2 digit CIP codes assigned to each of those five broad STEM fields. All CIP codes not associated with a STEM area were assigned to a Non-STEM category.

Table 3: Assignment of CIP Codes to STEM Areas

STEM Area	Abbreviation	2-digit CIP Code(s)
Engineering	01-ENGIN	14
Computer Science	02-COMP	11, 15
Biological / Health Sciences[4]	03-BIO/HLT	26, 51
Physical Sciences	04-PHYSICS	40, 41
Mathematics and Statistics	05-MATH	27
Non-STEM	09-NOTSTEM	All other CIP codes

Figure 3 presents the share of graduates by degree level whose last credential was earned in a STEM field. Overall, nearly a fourth of graduates with associate, bachelor, or master degrees graduated in a STEM field. STEM graduates in those three degree levels account for more than 90% of all STEM graduates, those not in college, and those matched in wage data who meet full-time worker criteria. Other degree levels[5] show higher percentages for STEM fields, but they represent a relatively small share of all college graduates.

Figure 4 presents the share of graduates in each STEM field and the percentages available and matched in wage data for all degree levels combined. The first thing to note is that STEM graduates in all areas except Biological and Health Sciences accounted for less than 5% of all college graduates from public institutions between 2007 and 2011. The Engineering and Computer Science areas accounted for nearly 5% of total graduates, but mathematics and physical science graduates combined accounted for less than 2% of all graduates (and only about 1% of the graduates matched in Missouri wage data). The share of wage matches for the Biological and Health Sciences graduates were slightly higher than their share of graduates indicating that they were slightly more likely to be employed and quite a bit more likely to have earnings meeting full-time worker criteria than graduates from other fields. The percent of the wage matches observed for Engineering, Physics, and Mathematics graduates was lower than their share of graduates suggesting that these graduates were somewhat less likely to be employed in Missouri than graduates of other fields.

[4] This analysis combined graduates with majors in CIP code 26 (Biological Sciences) and CIP code 51 (Health Care programs). The U.S. Office of Management and Budget charged the Standard Occupational Classification Policy Committee (SOCPC) to recommend a method for identifying and classifying STEM occupations and related training programs. The SOCPC recommended one domain for STEM occupations that included life sciences occupations and a domain for STEM-related occupations that included Health occupations. Table A.4 provides separate counts and employment statistics for graduates who earned degrees in Biological Sciences and for graduates who earned degrees in Health Care fields. Overall, more than 8 out of 10 non-enrolled graduates (81.6%) in our Biological / Health Sciences STEM cluster received degrees in a major related to Health Care.

[5] Just over 1,100 Education Specialist degree earners and 114 graduates for whom degree levels were not reported were omitted from Figure 3. All graduates with those degrees were in Non-STEM fields.

Figure 3: Percent of Graduates in STEM Areas by Degree Level

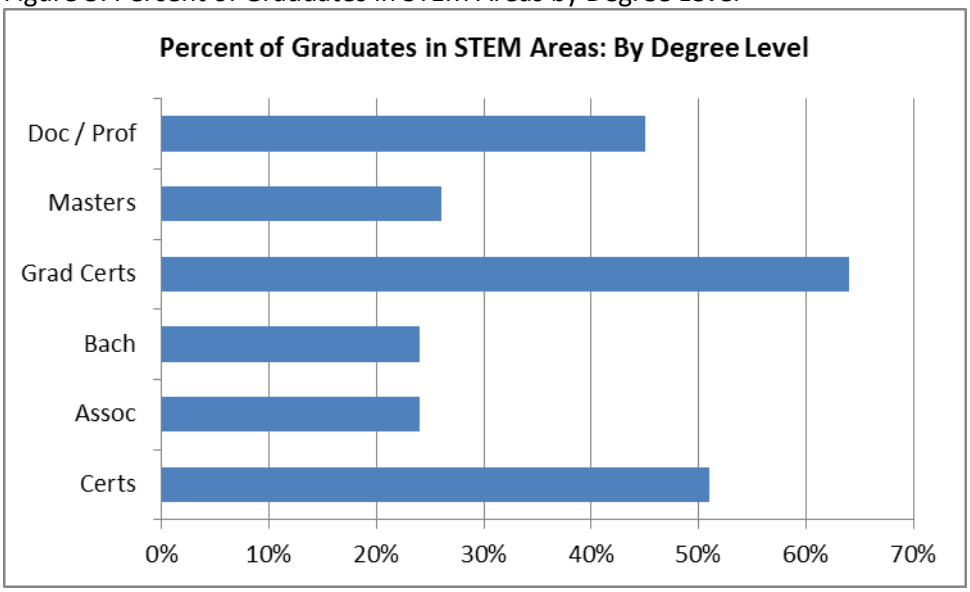


Figure 4: Percent of Graduates and Those Found Working in STEM Fields

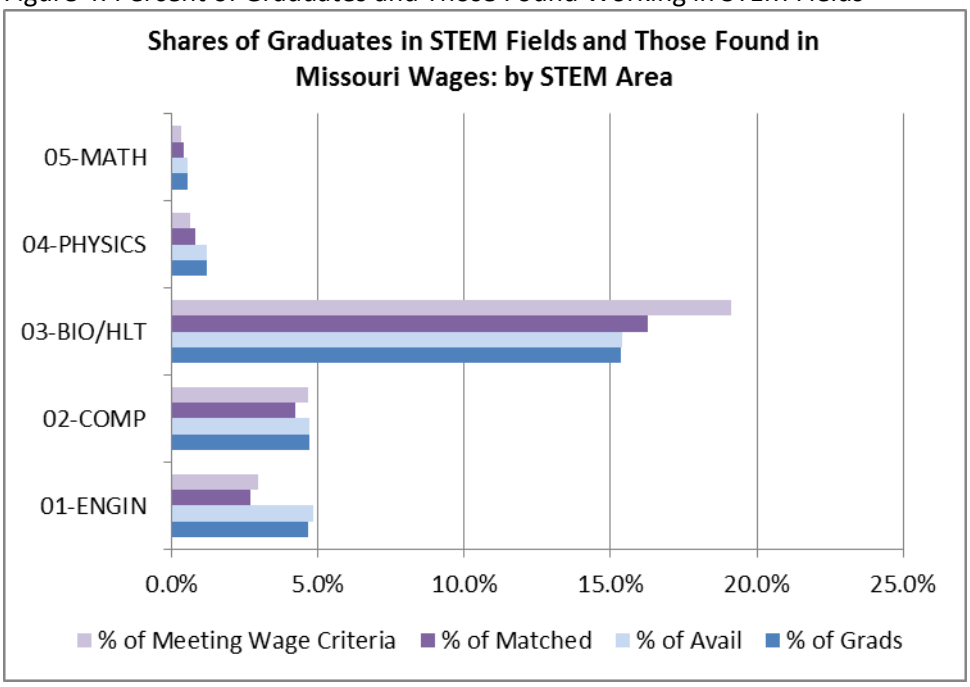


Table 4 presents more detailed information about STEM graduates and employment outcomes by degree level and STEM field. A summary of key findings for each degree level follows.

Undergraduate Certificate Graduates

Just more than half of all certificate graduates completed programs of study in a STEM field, with just over 70% of those completing a Biological / Health Sciences major. STEM graduates were more likely to be observed continuing their higher education than non-STEM graduates, especially those from the Biological / Health Sciences area. There were very few Engineering-related certificates so their employment outcomes could not be reported.

The overall wage match rate for non-STEM certificate holders was a bit higher than the rate for Computer Science graduates and lower than the rate for Biological / Health Sciences graduates. The Biological / Health sciences graduates matched in wage date were more likely than other matched certificate holders to meet full-time worker wage criteria. Median wages for full-time certificate graduates were highest for Computer Science certificate earners, followed by Biological / Health Science certificate earners. The median wages for graduates from these two STEM areas exceeded the median wages for other certificate graduates by approximately $7,000 and $2,000, respectively.

Associate Degree Graduates

Just less than one in four associate degree earners completed a degree in a STEM field, with Biological / Health Sciences (74%) and Computer Science (23%) accounting for nearly all of those graduates. Associate degree graduates with STEM majors were less likely to continue their college studies than those with non-STEM majors except for Engineering-related degrees.

Associate degree graduates with Biological / Health majors were most likely to be found in wage data, followed by Computer Science majors, and then non-STEM graduates. The percent of Associate degree graduates meeting full-time worker criteria was 30 to 40 percentage points lower for all types of majors except the Biological / Health Sciences majors where the difference was only 26 percentage points. Median earnings for graduates meeting full-time worker criteria from all of the STEM fields were higher than median earnings for associate degree graduates from non-STEM fields. Median earnings were highest for Biological / Health Sciences associate degree graduates. Wages for these graduates exceeded median earnings for Physical Science graduates (the group with the second highest median wage) by more than $5,500 and exceeded the median wage of non-STEM graduates by more than $16,000.

Bachelor Degree Graduates

The share of bachelor's degree earners in STEM fields was just under 25%, and like the STEM certificate and associate degree earners, there were more in the Biological / Health Sciences area than any other. However, the share of STEM graduates in Engineering was much higher, accounting for 24% of all STEM bachelor degrees. The share with Physical Science and Mathematics degrees also was larger, accounting for 10% of all STEM bachelor's degrees. Bachelor's graduates from the Biological / Health Sciences, Physical Science, and Mathematics STEM fields were slightly more likely than other bachelor's degree graduates to be observed enrolled after graduation. However, with the exception of graduates from Biological / Health Sciences majors, STEM graduates were less likely to be matched in Missouri wage data. This suggests the other STEM graduates may have accepted employment or continued their education in other states, or they may have enrolled in private institutions in Missouri.

Median wages for bachelor's degree graduates with any STEM major whose earnings met the full-time worker wage criteria were higher than median wages for non-STEM graduates. Engineering graduates had the highest median wage at more than $50,000 which was nearly twice the median wage for non-STEM graduates and nearly $10,000 higher than the median for graduates from the Biological / Health Sciences STEM field, the group with the second highest median wage. Median wages for Computer Science graduates were just below the median for Biological / Health Sciences graduates but still $8,000 to $11,000 higher than the median wage for graduates with Math and Physical Science bachelor's degrees.

Graduate Certificate Graduates

This group represents a relatively small share of all graduates and is heavily weighted to STEM degrees, with more than 60% of all such credentials awarded in one of the 5 STEM fields used for this report. Engineering STEM certificates were the most frequent, accounting for nearly half of the STEM graduate certificates awarded, and while the Biological / Health Sciences STEM field still accounted for a significant share of STEM certificates, only about a third of STEM certificates were in relevant majors. Graduate certificate earners in Engineering and Computer Science were more likely than others earning this type of credential to continue their education in public institutions.

The share of available graduates matched in Missouri wage data for STEM certificate earners was lower than the 62.5% of non-STEM graduates, especially those with Engineering-related certificates. The percent of STEM graduate certificate earners with wages meeting full-time worker criteria was only half as high (or less) than the 36.2% of non-STEM graduates. However, the median wage of graduate certificate earners who met the full-time worker criteria were between $27,500 and $45,600 higher than the $39,827 median earnings observed for non-STEM graduates.

Master's Degree Graduates

Just over a quarter of master's degree graduates majored in STEM fields. Biological / Health Sciences was the most frequent STEM area for master's STEM graduates, accounting for just over 40% of the group, with Engineering graduates accounting for an additional third of all STEM master's degree earners. More master's degree graduates with Physical Science or Mathematics degrees continued their studies in a public institution than any other group of master's degree earners, but still more than 75% of graduates from these STEM areas were available to match to wage data.

Two-thirds of non-STEM majors were matched in Missouri wage data, which was about the same as the Biological / Health Sciences graduates but well above the employment rates of all other master's degree earners with STEM degrees. Master's degree graduates from Engineering were the least likely to be found in Missouri wage data (around 20%) or to meet full-time worker criteria (14%). Similarly, only 26% of Computer Science graduates were matched in wage data and only 17% of the observed earnings for this group met full-time worker criteria. Full-time median wages for graduates with STEM master's degrees were higher than non-STEM graduates' wages in all cases except Physical Science STEM degree earners whose median wage was about $600 lower than the median for non-STEM graduates. Median wages for those meeting wage criteria were highest for Engineering graduates, followed by Computer Science and Health / Biological Science graduates. The largest difference between STEM and non-STEM median wages was nearly $27,000 for those with Engineering degrees and median wages for Computer Science and Biological / Heath Sciences graduates exceeded non-STEM graduates' median wages by more than $15,000.

Table 4: Public Higher Education Graduates Between 2007 and 2011 by Degree Level and STEM Area with Results from Matching to Wage Data

Degree Level and STEM Area	# of Grads	# Not in College[a]	% Avail for Wage Match	# Found in Wages	% Found in Wages	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
Certificates											
01-ENGIN	4	4	100.0%	NR	NR	NR	NR	NR	NR	NR	NR
02-COMP	982	687	70.0%	507	73.8%	28,240	21,808	302	44.0%	40,293	33,862
03-BIO/HLT	2,646	1,550	58.6%	1,322	85.3%	22,966	22,457	814	52.5%	30,160	28,566
04-PHYSICS	18	13	72.2%	NR	NR	12,292	7,093	NR	NR	NR	NR
09-NOTSTEM	3,517	2,619	74.5%	2,078	79.3%	21,094	19,051	1,116	42.6%	29,759	26,409
Total Certificates	**7,167**	**4,873**	**68.0%**	**3,917**	**80.4%**	**22,626**	**20,422**	**2,234**	**45.8%**	**31,327**	**28,012**
Associates Degrees											
01-ENGIN	97	57	58.8%	37	64.9%	17,084	6,227	13	22.8%	39,615	31,762
02-COMP	2,248	1,879	83.6%	1,505	80.1%	23,216	20,073	877	46.7%	32,633	28,724
03-BIO/HLT	7,128	6,356	89.2%	5,680	89.4%	31,908	33,404	4,044	63.6%	38,543	38,648
04-PHYSICS	160	151	94.4%	85	56.3%	25,787	25,448	42	27.8%	38,071	33,028
05-MATH	2	1	50.0%	NR	NR	NR	NR	NR	NR	NR	NR
09-NOTSTEM	30,586	23,318	76.2%	18,182	78.0%	15,506	12,343	7,980	34.2%	26,083	22,340
Total Associate Degrees	**40,221**	**31,762**	**79.0%**	**25,489**	**80.3%**	**19,653**	**15,962**	**12,956**	**40.8%**	**30,468**	**27,291**
Bachelor Degrees											
01-ENGIN	4,921	4,446	90.4%	2,232	50.2%	34,395	37,103	1,300	29.2%	48,839	50,265
02-COMP	3,196	2,930	91.7%	2,045	69.8%	29,403	28,507	1,257	42.9%	39,733	38,658
03-BIO/HLT	10,205	8,943	87.6%	6,704	75.0%	27,317	25,344	3,784	42.3%	39,945	40,674
04-PHYSICS	1,320	1,120	84.9%	618	55.2%	15,294	10,772	235	21.0%	29,083	27,636
05-MATH	598	500	83.6%	306	61.2%	17,891	13,125	124	24.8%	33,274	30,126
09-NOTSTEM	65,488	59,207	90.4%	43,475	73.4%	18,165	16,449	22,325	37.7%	27,324	25,439
Total Bachelor Degrees	**85,728**	**77,146**	**90.0%**	**55,380**	**71.8%**	**20,308**	**17,726**	**29,025**	**37.6%**	**30,510**	**27,764**
Graduates Certificates											
01-ENGIN	237	132	55.7%	29	22.0%	70,774	70,581	18	13.6%	90,069	85,458
02-COMP	91	49	53.9%	19	38.8%	48,735	42,102	9	18.4%	69,036	67,371
03-BIO/HLT	166	127	76.5%	63	49.6%	52,982	32,464	24	18.9%	88,594	79,481
04-PHYSICS	5	4	80.0%	NR	NR	7,937	7,937	NR	NR	NR	NR

Degree Level and STEM Area	# of Grads	# Not in College[a]	% Avail for Wage Match	# Found in Wages	% Found in Wages	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
05-MATH	2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
09-NOTSTEM	277	224	80.9%	140	62.5%	29,997	28,440	81	36.2%	41,315	39,827
Total Graduate Certs	**778**	**536**	**68.9%**	**253**	**47.2%**	**41,627**	**32,789**	**132**	**24.6%**	**58,449**	**46,182**
Masters Degrees											
01-ENGIN	2,292	2,107	91.9%	419	19.9%	55,396	57,128	292	13.9%	70,231	66,554
02-COMP	1,389	1,332	95.9%	343	25.8%	45,245	48,213	222	16.7%	59,622	56,188
03-BIO/HLT	2,956	2,841	96.1%	1,925	67.8%	49,491	45,826	1,396	49.1%	59,503	54,217
04-PHYSICS	335	254	75.8%	93	36.6%	29,328	28,000	52	20.5%	42,047	39,049
05-MATH	253	206	81.4%	99	48.1%	30,917	32,574	57	27.7%	44,342	42,898
09-NOTSTEM	20,445	18,721	91.6%	12,609	67.4%	33,709	34,014	8,454	45.2%	42,498	39,639
Total Masters Degrees	**27,670**	**25,461**	**92.0%**	**15,488**	**60.8%**	**36,469**	**35,484**	**10,473**	**41.1%**	**45,909**	**41,429**
Education Special											
09-NOTSTEM	1,108	965	87.1%	866	89.7%	56,705	55,972	708	73.4%	62,430	59,834
Total Education Special	**1,108**	**965**	**87.1%**	**866**	**89.7%**	**56,705**	**55,972**	**708**	**73.4%**	**62,430**	**59,834**
Doctorate or Professional Degrees											
01-ENGIN	354	353	99.7%	113	32.0%	37,949	33,893	63	17.8%	52,671	51,228
02-COMP	43	42	97.7%	18	42.9%	51,122	53,952	13	31.0%	60,153	59,884
03-BIO/HLT	2,873	2,831	98.5%	1,355	47.9%	56,626	45,265	926	32.7%	70,503	55,032
04-PHYSICS	198	197	99.5%	60	30.5%	31,199	25,150	29	14.7%	48,160	38,259
05-MATH	75	75	100.0%	18	24.0%	33,195	31,405	8	10.7%	50,252	48,656
09-NOTSTEM	2,919	2,855	97.8%	1,606	56.3%	38,702	33,396	898	31.5%	55,500	49,129
Total Doc / Prof Degrees	**6,462**	**6,353**	**98.3%**	**3,170**	**49.9%**	**46,234**	**40,884**	**1,937**	**30.5%**	**62,480**	**51,228**
Miscellaneous											
09-NOTSTEM	114	95	83.3%	82	86.3%	28,310	32,487	59	62.1%	34,724	35,012
Total	**169,134**	**147,096**	**87.0%**	**104,645**	**71.1%**	**---**	**---**	**57,524**	**39.1%**	**---**	**---**

[a] Not in a public Missouri college or university

[b] In 4 consecutive quarters after graduation with annual earnings between $14,000 and $499,999

NR and HIGH indicate results were suppressed due to small number of observations or too few unknown cases.

Summary

Overall, only about 25% of public higher education graduates between 2007 and 2011 received their last degree or certificate in a STEM field. Those whose last credential from public higher education was a certificate (undergraduate or graduate) or a terminal professional or doctorate degree were more likely to graduate with a STEM major than graduates from other degree levels. The Biological / Health Sciences STEM field accounted for more STEM graduates than any other STEM field, especially among graduates earning less than a bachelor's degree.

At lower attainment levels, those with STEM majors in the Biological / Health Sciences field and to a lesser extent those in Computer Science majors were more likely to be matched in Missouri wage data, meet the criteria as full-time workers, and enjoyed relatively higher first year earnings than other peer graduates. The prevalence of graduates with these majors among certificate and associate degree earners suggests that students pursuing these relatively "short time to completion" degrees are focused on majors with immediate labor market payoffs.

Graduates from Engineering and Computer Science STEM fields accounted for larger shares of STEM graduates at higher degree levels, but those graduates were often more likely to enroll in a public college after graduating, and of those not excluded because of continuing studies, were less likely to be found in Missouri wage data or to meet the full-time worker criteria. Graduates in these fields who were matched in Missouri wage data and met the full-time worker wage criteria enjoyed higher median wages than graduates in other STEM fields and their non-STEM peers. These findings suggest that many STEM graduates in these fields may be working or continuing their education in other states, since the evidence indicates high positive outcomes for those graduates who are able to secure post-graduate employment in Missouri.

Finally, there are relatively few graduates from Mathematics and Physical Sciences STEM fields. Of those graduates not continuing their education in a Missouri public institution, relatively small percentages are matched to wage data and meet the full-time worker criteria. Those that do meet wage criteria do not enjoy appreciably higher wages than their non-STEM peers and often have lower median wages than other STEM graduates.

Analysis 4: Employment and Earnings by Degree Level, STEM Focus, and Industry

The previous analyses examined employment outcomes of graduates by degree level, major, and STEM focus. All of these analyses are focused on the nature of the "inputs" to graduates' human capital development. Put another way, these analyses focus on characteristics of the supply of labor. In this analysis, the focus is switched to examining the industries that hire college graduates with different kinds of degrees.

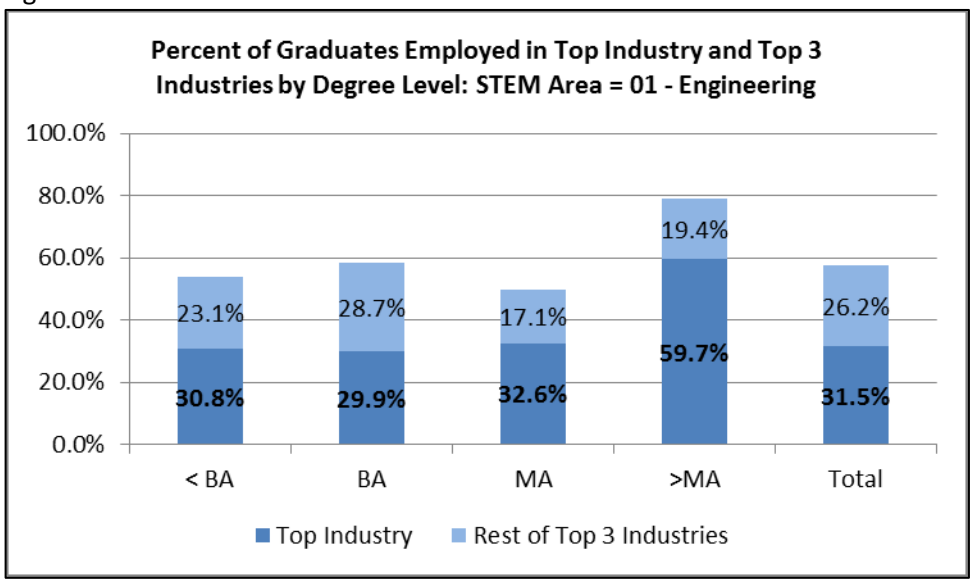
The first year earnings of each graduate found in Missouri wage records who met the criteria for full-time worker were grouped and summed by NAICS code. The industry with the largest share of earnings in the year for each matched graduate was that graduate's primary employing industry. The primary industry code, wages paid in that industry, and the total wages over the first year for each matched graduate were saved. Graduates were grouped by STEM field and degree level. Average and median earnings were calculated for the three most frequent primary industries appearing in the data for each STEM field and degree level group. Average and median earnings for all remaining graduates in the STEM field and degree level group were calculated for reporting purposes and appear in tables as "Other Industries." Key findings are presented for each STEM area.

01-Engineering Graduates

Figure 4.01 shows the share of all graduates with Engineering-related STEM majors employed in the top three employing industries by degree level, and Table 4.01 presents earnings data for the various groups of graduates. Overall, nearly 60% of graduates in this STEM area are employed in the top 3 industries listed in Table 4.01, and there is little variation in the percentages in the primary industry or the top 3 primary industries by degree level. The one exception is the group of Engineering graduates with more than a master's degree, and in that case the top industry is 61 - Educational Services, suggesting that those earning terminal degrees in Engineering were teaching or conducting research in educational institutions rather than performing other Engineering duties. For all graduates in this STEM area meeting full-time worker criteria, the share of total earnings accounted for by employment in the primary industry was greater than 90%.

The number of certificate earners in this STEM group is so small that interpreting industry employment of those graduates is potentially misleading and , thus, is omitted for the general discussion. For bachelor's degree graduates, about 30% were employed in the 54 - Professional, Scientific, & Tech Services industry, most likely performing engineering related functions. It is likely that most of the jobs held by workers in the other two top employing industries 33 – Manufacturing and 23 – Construction are related to graduates' Engineering training. Median first year primary industry earnings for bachelor's graduates in two of the top three industries were about $3,000 higher than earnings for bachelor's level Engineering graduates with other industries as their primary industry.

Figure 4.01



Approximately half of the Masters level graduates in the Engineering STEM area were employed in the Technical Services, Manufacturing, or Utilities industries with nearly a third employed in the Technical Services industry. Again, the jobs held by the graduates in these industries were likely related to their degree programs. Median first year primary industry earnings for the graduates in the top 3 industries were relatively high at around $56,000 to $66,000, which was about $10,000 to $15,000 higher than primary industry earnings for bachelor's degree graduates in this STEM field.

Interestingly, master's level Engineering graduates working in the industries not listed (roughly half of the relevant subgroup) had median first year earnings approaching $80,000. An examination of the NAICS industry codes for this group of 156 graduates indicated that the NAICS industry code was unknown for about two-thirds of the graduates. This group of 103 Master's degree recipients had average annual earnings of just over $87,000. The remaining 53 graduates in this group were employed in a variety of industries with 92 - Public Administration, 61 – Education Services, and 42 – Wholesale Trade accounting for 28 of the 53 graduates. Average earnings in these other industries ranged from about $48,000 in Education Services to $63,000 in Wholesale Trade.

Table 4.01: Top three industries where graduates Engineering STEM majors were employed – by degree level

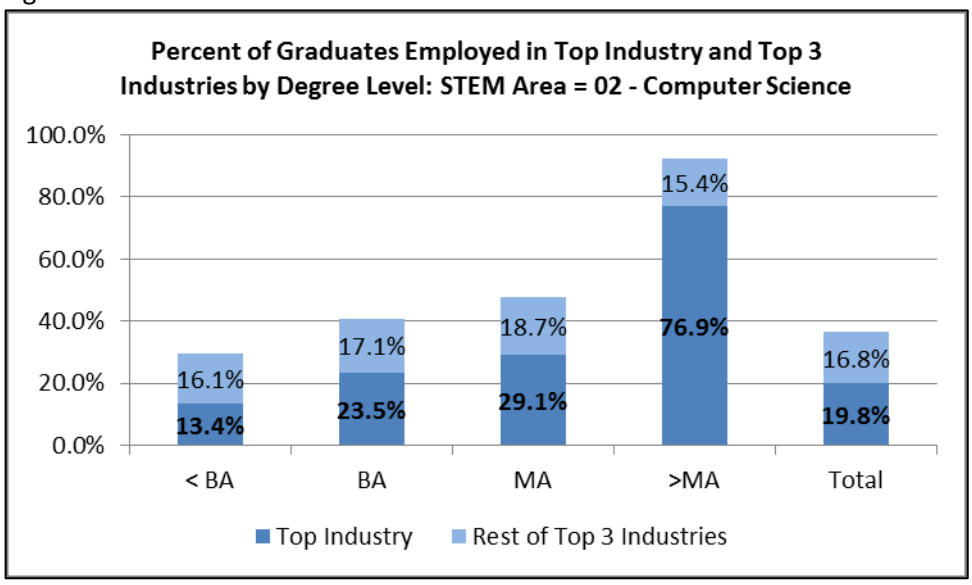
STEM Field and Degree Level	Industry Name (NAICS)	# Grads Matched in Wages	Average Wage for NAICS ($$)	Median Wage for NAICS ($$)	Range of Wage for NAICS ($$)	Average Total Wage ($$)	Median Total Wage ($$)	Range of Total Wage ($$)	Median NAICS Wage as % of Median Total Wage
01-ENGINEERING									
Less than BA/BS	33 - Manufacturing	4	NR	NR	NR	NR	NR	NR	
	54 - Professional, Scientific, & Tech Services	2	NR	NR	NR	NR	NR	NR	
	44 - Retail Trade	1	NR	NR	NR	NR	NR	NR	
	Other Industries	6	40,821	26,940	103,419	40,821	26,940	103,419	100.0%
BA/BS	54 - Professional, Scientific, & Tech Services	384	49,768	51,783	137,891	50,875	51,942	133,360	99.7%
	33 - Manufacturing	240	45,441	47,089	88,247	47,962	49,334	81,202	95.4%
	23 - Construction	129	51,039	50,524	129,939	51,722	50,613	129,323	99.8%
	Other Industries	532	46,033	47,907	134,272	48,073	48,731	126,639	98.3%
MASTERS	54 - Professional, Scientific, & Tech Services	101	61,877	59,907	141,172	64,004	61,239	136,605	97.8%
	33 - Manufacturing	31	59,182	56,327	93,797	61,383	57,308	79,823	98.3%
	22 - Utilities	22	72,730	66,064	89,813	73,902	67,084	82,022	98.5%
	Other Industries	156	77,053	78,517	131,348	77,792	78,862	131,348	99.6%
MORE THAN MASTERS	61 - Educational Services	37	42,177	37,845	60,476	42,796	39,158	60,476	96.6%
	33 – Manufacturing	8	56,546	59,035	51,427	66,519	63,074	64,836	93.6%
	22 - Utilities	4	NR	NR	NR	NR	NR	NR	
	Other Industries	13	65,449	64,362	63,598	69,895	64,362	57,649	100.0%

02-Computer Science Graduates

Figure 4.02 shows the share of all graduates with Computer Science STEM majors employed in the top three employing industries by degree level and Table 4.02 presents relevant earnings data for the various groups of graduates. Graduates from this STEM field are less likely to be concentrated in selected industries, though industry concentration increases with degree level. Given the role of information technology and computer applications across all sectors of society, this lack of concentration is not unexpected, though it does make it more difficult to estimate the degree to which employment is related to individuals' level of education and training. Less than 30% of certificate earners were employed in the top three industries, though this increased to nearly 50% for those with Master's degrees. Figure 4.02 shows more than 90% of graduates with terminal degrees in Computer Science were employed in the top 3 primary industries, although Table 4.02 reveals that this high rate is based on less than 15 graduates. Overall, 36% of graduates in this STEM area were employed in the top 3 industries listed in Table 4.02. There is variation in the top 3 primary industries by degree level, with only industry 54 - Professional, Scientific, & Tech Services appearing among the top 3 industries for all degree levels.

Only one of the top 3 industries employing certificate earners with Computer Science majors - 54 - Professional, Scientific, & Tech Services - represents an industry where the nature of the services provided to customers is directly related to technology. Manufacturing was the top industry employing certificate earners with Computer Science majors and also was the industry with the highest industry median wage of over $31,000, which may suggest that the graduates were utilizing their college training in their jobs. (It also is possible that all jobs in manufacturing industries pay higher wages.) The median primary industry wage for those employed in manufacturing was about $2,000 higher than the median for those employed in the Scientific and Technical Services industry and about $3,000 higher than the median primary industry earnings for Computer Science certificate earners working in other primary industries. Less than 10% of graduates from this group were employed in Retail Trade, and these graduates had the lowest first year median primary industry earnings and lowest median total earnings of any group of graduates with Computer Science STEM degrees.

Figure 4.02



Over 40% of bachelor's degree graduates with Computer Science degrees were employed in the top 3 industries, with nearly a quarter employed in the 54 - Professional, Scientific, & Tech Services industry, and

another 10% employed in 33 – Manufacturing. The third most frequent primary industry for bachelor's graduates in Computer Science was 23 – Construction. It is likely that most graduates in the Professional Services and Manufacturing primary industries were in jobs related to their training. Median industry earnings for those two primary industries exceeded $42,000 and were up to $9200 higher than median industry earnings for other graduates with bachelor's degrees in Computer Science.

Nearly 30% of the 230 master's degree graduates in Computer Science were employed in the 54 – Professional, Scientific, & Tech Services industry. Median industry earnings for Computer Science master's graduates ranged from just over $44,500 for those with Educational Services as their primary industry to over $58,000 for those in industries outside the top 3, which was higher than median industry earnings for any of the top 3 primary industries.

Primary industry earnings for Computer Science graduates increased significantly from degree level to degree level. Median industry earnings for bachelor's graduates in this STEM area were generally more than $10,000 higher than industry earnings for certificate graduates in the top 3 primary industries, and more than $5,000 higher for those in other primary industries. Similarly, primary industry earnings for master's graduates in the top 3 industries were more than $12,000 higher than those for bachelor's graduates in the top 3 industries. The median primary industry earnings for master's degree level Computer Science graduates in industries other than the top 3 were more than $24,000 higher than median industry earnings for bachelor's degree graduates employed in industries outside the top 3.

Table 4.02 Top three industries where graduates with Computer Science STEM majors were employed – by degree level

STEM Field and Degree Level	Industry Name (NAICS)	# Grads Matched in Wages	Average Wage for NAICS ($$)	Median Wage for NAICS ($$)	Range of Wage for NAICS ($$)	Average Total Wage ($$)	Median Total Wage ($$)	Range of Total Wage ($$)	Median NAICS Wage as % of Median Total Wage
02-COMPUTER									
Less than BA/BS	33 - Manufacturing	154	36,871	31,347	115,670	38,612	32,492	110,149	96.5%
	54 - Professional, Scientific, & Tech Services	95	33,573	29,481	80,122	36,301	31,877	76,476	92.5%
	44 - Retail Trade	90	24,040	20,851	48,443	26,157	23,549	42,864	88.5%
	Other Industries	810	32,859	28,101	122,479	35,364	30,205	113,991	93.0%
BA/BS	54 - Professional, Scientific, & Tech Services	290	43,899	43,007	91,420	45,517	44,226	86,266	97.2%
	33 - Manufacturing	124	42,266	42,247	84,245	43,740	43,080	79,891	98.1%
	23 - Construction	87	37,944	37,555	73,147	40,207	39,373	77,349	95.4%
	Other Industries	734	35,065	33,812	126,655	37,508	36,068	119,079	93.7%
MASTERS	54 - Professional, Scientific, & Tech Services	67	56,615	55,779	81,624	58,515	56,176	88,706	99.3%
	61 - Educational Services	22	48,933	44,534	103,076	51,284	48,323	116,076	92.2%
	52 - Finance and Insurance	21	59,256	55,840	91,660	61,853	59,614	91,660	93.7%
	Other Industries	120	60,749	58,330	124,700	62,476	58,919	127,088	99.0%
MORE THAN MASTERS	61 - Educational Services	10	51,400	53,952	66,182	51,960	53,952	66,182	100.0%
	54 - Professional, Scientific, & Tech Services	2	NR	NR	NR	NR	NR	NR	
	Other Industries	1	NR	NR	NR	NR	NR	NR	

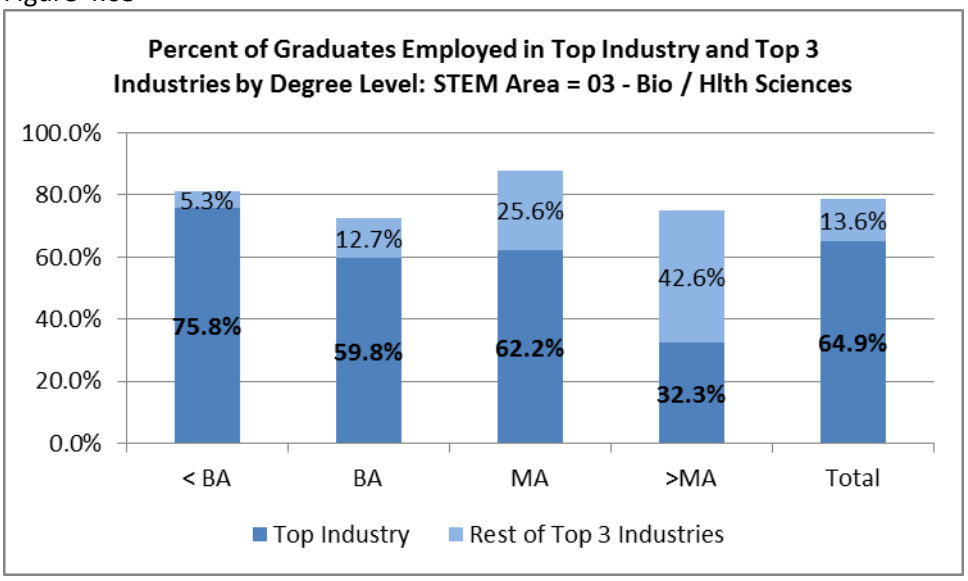
03-Biological and Health Sciences Graduates

This is by far the largest group of STEM graduates with nearly 11,000 individuals in the analysis group[6]. Figure 4.03 shows the share of all graduates with Biological and Health Sciences degrees employed in the top three primary industries by degree level and Table 4.03 presents earnings data. Employment of graduates in this STEM field is concentrated in 3 industries, with nearly two-thirds of employment in the same top primary industry, 62 – Health Care and Social Assistance. The other industries in the top 3 for this STEM area were Educational Services and Professional, Scientific, and Technical Services. There is no variation in the top 3 primary industries shown for each degree level with only a few differences in the relative ranking of the second and third most frequent primary industries. Overall, nearly 80% of all employment of graduates in this STEM area was observed in one of the top three primary industries. It is likely that the majority of graduates employed in one of these industries are in occupations related to their majors.

Just over three-fourths of certificate earners were employed in the Health Care industry which also had the highest median industry earnings of nearly $35,500 (although the graduates with primary industries outside the top 3 had similar median first year industry earnings). The lowest median industry wage among this group was for those graduates with primary employment in the Professional, Scientific, and Technical Services industry where the median graduate earned nearly $14,000 less than the median graduate with primary employment in the Health Care industry.

The level of concentration in the Health Care and top 3 industries overall was somewhat lower for the bachelor's degree graduates than for the certificate (and master's degree) graduates. Only about 60% of bachelor's graduates in this STEM area whose earnings met the full-time worker criteria were found employed in the Health Care industry. Median industry earnings for these graduates employed in the Health Care industry were over $42,000, which was more than $15,000 higher than the median industry earnings for those employed in the Professional, Scientific, and Technical Services industry.

Figure 4.03



[6] More than 80% of the graduates in this STEM cluster completed majors related to health care occupations.

Employment of Biological and Health Sciences graduates with master's degrees was more concentrated in the top 3 industries than employment of these STEM graduates with other degrees. More than 88% of master's degree graduates in Biological and Health Sciences were employed in the top 3 primary industries. Median first year industry earnings for those employed in the Health Care industry were nearly $56,000, exceeding median industry earnings of workers in Educational Services by more than $18,000 and exceeding the primary industry earnings of those employed outside the top 3 industries by about $13,500.

Graduates with terminal degrees in this STEM area were less likely to work in the Health Care industry, even though just under 75% of the employed graduates were in one of the same top 3 primary industries as graduates in this STEM area with other degrees. Median industry earnings for graduates employed in the Health Care industry were over $65,000 and were more than $20,000 higher than the median industry earnings for those employed in the Educational Services industry. Interestingly, the terminal degree graduates from this STEM field who were not employed in one of the three most frequent primary industries had the highest median primary industry earnings of nearly $108,000.

As noted for other STEM graduates, the median industry earnings from the primary industry increase with degree level, with the highest median earnings rising from around $35,000 for those with a certificate in a Biological / Health Sciences area to over $108,000 for those with more than a master's degree.

Table 4.03 Top three industries where graduates with Biological / Health Sciences STEM majors were employed – by degree level

STEM Field and Degree Level	Industry Name (NAICS)	# Grads Matched in Wages	Average Wage for NAICS ($$)	Median Wage for NAICS ($$)	Range of Wage for NAICS ($$)	Average Total Wage ($$)	Median Total Wage ($$)	Range of Total Wage ($$)	Median NAICS Wage as % of Median Total Wage
03-BIOLOGY/HEALTH									
Less than BA/BS	62 - Health Care and Social Assistance	3,635	35,114	35,436	108,654	37,819	37,687	100,356	94.0%
	54 - Professional, Scientific, & Tech Services	134	23,807	21,620	94,491	24,752	22,091	95,852	97.9%
	61 - Educational Services	118	32,283	30,475	75,037	35,064	32,843	70,636	92.8%
	Other Industries	907	34,486	35,280	105,897	38,192	38,303	99,151	92.1%
BA/BS	62 - Health Care and Social Assistance	2,222	41,627	42,054	112,570	43,607	43,143	106,195	97.5%
	61 - Educational Services	381	35,189	35,080	104,322	36,878	36,363	97,944	96.5%
	54 - Professional, Scientific, & Tech Services	90	27,568	25,639	68,445	29,837	28,375	61,342	90.4%
	Other Industries	1,020	32,642	31,774	108,348	35,863	35,270	109,112	90.1%
MASTERS	62 - Health Care and Social Assistance	880	62,186	55,936	315,617	66,905	61,435	312,422	91.0%
	61 - Educational Services	324	43,518	37,736	232,367	46,194	40,269	227,803	93.7%
	54 - Professional, Scientific, & Tech Services	38	57,166	47,184	169,159	60,439	54,232	161,552	87.0%
	Other Industries	172	47,954	42,434	160,463	52,167	44,230	171,193	95.9%
MORE THAN MASTERS	62 - Health Care and Social Assistance	299	72,623	65,602	175,156	75,483	69,084	173,527	95.0%
	61 - Educational Services	291	43,689	44,004	92,944	44,769	44,032	92,944	99.9%
	54 - Professional, Scientific, & Tech Services	103	57,103	57,500	72,864	57,894	57,692	72,864	99.7%
	Other Industries	232	97,643	107,739	195,132	102,212	112,049	223,505	96.2%

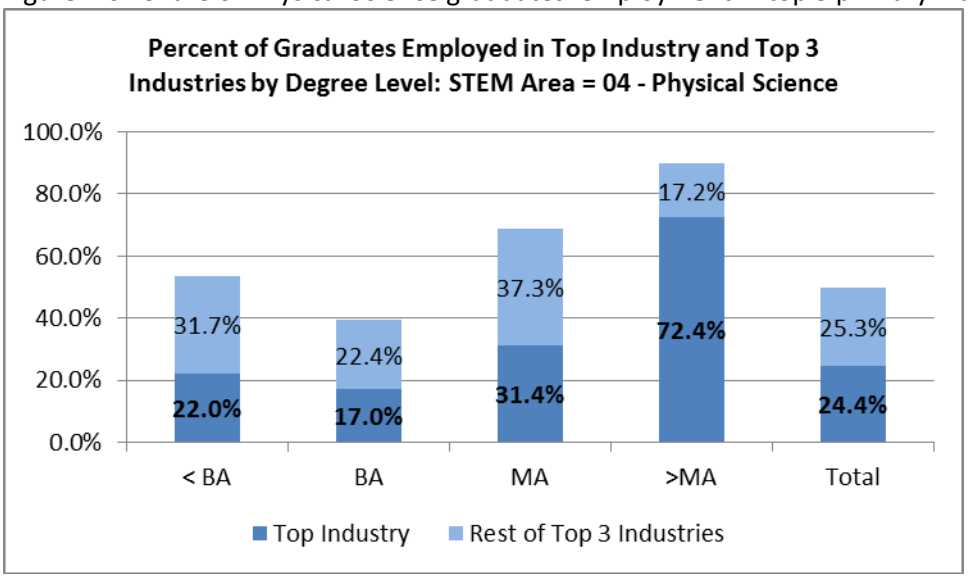
04 - Physical Science Graduates

There were fewer than 500 graduates over the 5 year period with degrees in the physical sciences who were matched in Missouri wage data with total first year earnings that met the full-time worker criteria. Figure 4.04 shows the share of those graduates with Physical Science STEM majors employed in the top three employing industries by degree level, and Table 4.01 presents earnings data for those graduates. The top 3 primary industries for these graduates are the same across all degree levels except the post master's group where Manufacturing was one of the top primary industries, though this subgroup include only 29 graduates. Overall, about half of the graduates from this STEM field were employed in one of the three common primary industries.

The graduates earning certificates in Physical Science majors represent a relatively small group, and interestingly, the primary industry (which accounted for nearly a fourth of those graduates) was 61 – Educational Services. However, it is unclear if employment in this industry was related to graduates' college majors without knowing the relevant occupations. The median industry earnings of over $35,000 for these graduates was a couple thousand dollars higher than certificate holders employed in industries outside the top 3 and about $8,000 to $15,000 higher than the median wage for graduates in the other two top industries.

Bachelor's degree earners represent nearly two-thirds of the graduates in the Physical Science STEM field included in this analysis, and for this group, only about 40% of the matched workers were primarily employed in one of the top three primary industries. Industry 54 - Professional, Scientific, and Technical Services was the primary industry for Physical Science bachelor's degree earners, with about 1 in 6 of these graduates working in this industry. Median industry earnings for these employees was higher than any of the other primary industry groups at almost $33,000, nearly $10,000 more than the median earnings for the second most frequent primary industry (Educational Services) and nearly $15,000 more than median earnings for the third most frequent primary industry (56 – Administrative … Remediation Services). The median industry earnings for the Physical Science bachelor's degree graduates working in other primary industries were just over $22,000, about $1,200 less than the median industry wage for similar graduates working in the Educational Services industry.

Figure 4.04 Share of Physical Science graduates' employment in top 3 primary industries by degree level



The top three primary industries for Physical Science graduates with master's degrees were the same as those observed for bachelor's degree graduates, though a much larger share (nearly 70%) were concentrated in those primary industries. It should be noted, however, that the sample of Physical Science master's degree graduates was much smaller (only 51 graduates) than the sample of bachelor's degree earners. The highest median industry earnings of over $42,600 was observed for the top primary industry for master's degree graduates - 54 – Professional, Scientific, and Technical Services. Median industry earnings for the other groups of employed master's graduates with Physical Science degrees ranged from a low of just over $24,000 for those employed in the Administrative … Remediation Services industry to just over $37,500 for those whose primary industry was not in the top 3. Other industries where Physical Science master's degree graduates were employed included 32 – Manufacturing and 92 – Public Administration. Average earnings in those industries were just over $51,000 those in Manufacturing and approximately $35,000 for those in Public Administration.

Graduates with doctoral degrees in Physical Science with earnings meeting full-time worker criteria were almost all in the Educational Services industry where median industry wages were $34,750.

Table 4.04 Top three industries where graduates with Physical Science STEM majors were employed – by degree level

STEM Field and Degree Level	Industry Name (NAICS)	# Grads Matched in Wages	Average Wage for NAICS ($$)	Median Wage for NAICS ($$)	Range of Wage for NAICS ($$)	Average Total Wage ($$)	Median Total Wage ($$)	Range of Total Wage ($$)	Median NAICS Wage as % of Median Total Wage
04-PHYSICS									
Less than BA/BS	61 - Educational Services	9	34,703	35,283	35,744	36,847	37,380	26,537	94.4%
	56 – Admin & Support & Waste Mgmt & Remediation Services	7	20,772	19,782	24,431	26,818	24,335	24,958	81.3%
	54 - Professional, Scientific, & Tech Services	6	26,385	26,686	11,273	29,368	28,083	10,703	95.0%
	Other Industries	19	43,854	32,780	87,139	48,287	34,750	75,996	94.3%
BA/BS	54 - Professional, Scientific, & Tech Services	38	31,554	32,932	48,656	33,490	33,330	41,760	98.8%
	61 - Educational Services	25	26,370	23,626	69,603	27,841	26,907	64,959	87.8%
	56 – Admin & Support & Waste Mgmt & Remediation Services	25	23,333	18,481	45,932	27,821	24,954	39,062	74.1%
	Other Industries	135	25,896	22,269	81,413	29,726	27,690	74,226	80.4%
MASTERS	54 - Professional, Scientific, & Tech Services	16	44,825	42,634	41,183	46,105	42,980	39,071	99.2%
	61 - Educational Services	13	30,742	35,730	49,882	31,855	35,730	45,460	100.0%
	56 – Admin & Support & Waste Mgmt & Remediation Services	6	43,288	24,182	111,174	46,754	31,403	108,364	77.0%
	Other Industries	16	44,111	37,358	113,342	46,304	41,184	103,684	90.7%
MORE THAN MASTERS	61 - Educational Services	21	37,854	34,750	54,307	38,796	35,668	47,307	97.4%
	54 - Professional, Scientific, & Tech Services	3	NR	NR	NR	NR	NR	NR	
	33 - Manufacturing	2	NR	NR	NR	NR	NR	NR	
	Other Industries	3	NR	NR	NR	NR	NR	NR	

05 – Mathematics / Statistics Graduates

This STEM field had the smallest number of graduates meeting full-time worker criteria (only 182 graduates), and there were no credentials below a bachelor's degree awarded in Mathematics. Figure 4.05 suggests that graduate employment is relatively concentrated in the top 3 primary industries. 52 - Finance and Insurance and 61 - Education are the primary industries that occur most often for these graduates, accounting for just over half of those included in this analysis.

Just over half of bachelor's degree graduates with Math majors were concentrated in the top 3 primary industries, with about 20% in both the Educational Services and Finance and Insurance industries. Median industry earnings for workers in the Finance and Insurance industry were just over $30,000, about $5,000 higher than median industry earnings for workers in in the Educational Services industry. Bachelor's graduates working in the Professional, Scientific, and Technical Services industry had the highest median industry earnings of over $43,000 which was about $18,000 higher than median industry earnings for graduates in primary industries not in the top 3.

More than 80% of the master's degree graduates with Math majors included in this analysis were employed in one of the top 3 industries with nearly two in three employed in 61 – Educational Services. Median industry earnings for this group were more than $42,400, about $1,000 lower than the median industry earnings for graduates whose primary industry was 52 – Finance and Insurance. Graduates in primary industries not in the top 3 had the highest median primary industry earnings of more than $48,000.

Like the Physical Science STEM field, doctoral graduates in Mathematics were primarily employed in the Educational Services industry and their median industry earnings of close to $41,000 were a bit lower than median earnings for most master's degree graduates.

Figure 4.05 Share of Mathematics graduates' employment in top 3 primary industries by degree level

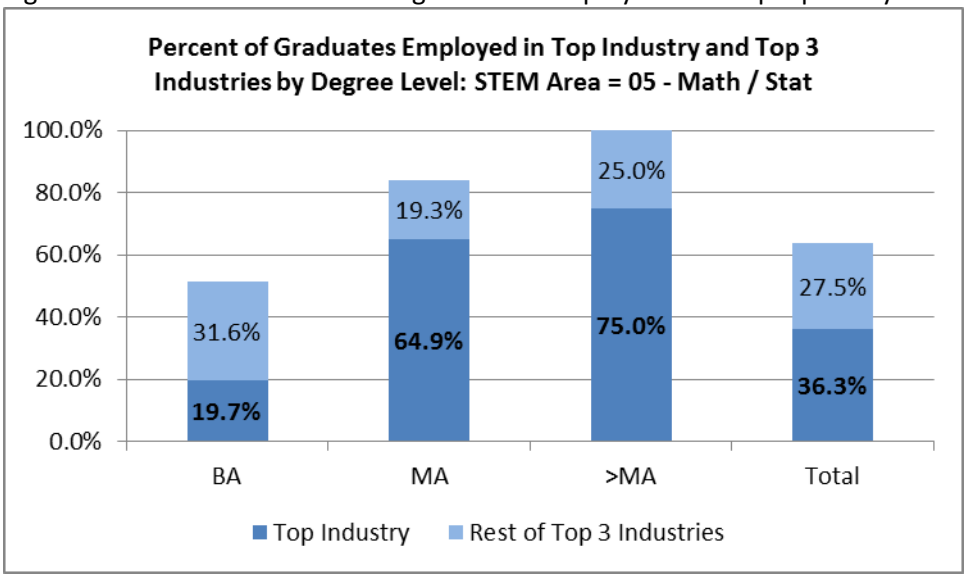


Table 4.05 Top three industries where graduates with Mathematics STEM majors were employed – by degree level

STEM Field and Degree Level	Industry Name (NAICS)	# Grads Matched in Wages	Average Wage for NAICS ($$)	Median Wage for NAICS ($$)	Range of Wage for NAICS ($$)	Average Total Wage ($$)	Median Total Wage ($$)	Range of Total Wage ($$)	Median NAICS Wage as % of Median Total Wage
05-MATH									
BA/BS	52 - Finance and Insurance	23	31,510	30,074	49,052	34,958	32,478	54,222	92.6%
	61 - Educational Services	22	25,295	25,420	31,364	28,311	27,032	30,502	94.0%
	54 - Professional, Scientific, & Tech Services	15	43,228	43,262	57,614	47,988	47,306	72,435	91.5%
	Other Industries	57	29,228	24,844	56,499	33,093	28,773	73,394	86.3%
MASTERS	61 - Educational Services	37	42,190	42,461	59,240	43,899	42,898	55,740	99.0%
	52 - Finance and Insurance	6	45,538	43,400	50,619	45,569	43,495	50,619	99.8%
	92 - Public Administration	5	26,364	27,914	19,486	30,943	29,119	17,318	95.9%
	Other Industries	9	47,218	48,126	59,451	52,793	49,177	56,959	97.9%
MORE THAN MASTERS	61 - Educational Services	6	43,715	40,921	62,177	48,133	47,041	60,377	87.0%
	92 - Public Administration	1	NR	NR	NR	NR	NR	NR	
	62 - Health Care and Social Assistance	1	NR	NR	NR	NR	NR	NR	
	Other Industries	0							

09 – Non-STEM Graduates

Figure 4.09 shows the share of all graduates from non-STEM majors meeting full-time worker criteria who were employed in the top 3 primary industries for the group. The concentration of employment in the top 3 primary industries increased with degree level, from just under a third for those with certificates and associate degrees to more than 90% for those with degrees above the master's level (which does include the Educational Specialist degree earners.) Just under 40% of employed bachelor's graduates were concentrated in the top 3 primary industries.

Interestingly, the industries that were the most frequent primary industries for non-STEM graduates include the same industries observed for graduates from STEM areas, though concentration levels were lower. Health Care was the top industry employing graduates with lower level degrees, and the relative ranking of this industry as a primary industry declined with each successive degree level, becoming the second most frequent primary industry for non-STEM bachelor's degree graduates, third most frequent for master's degree graduates, and not among the top 3 for graduates above the master's level. For all non-STEM graduates with bachelor's degrees or above, the top primary industry was Education.

Table 4.09 presents earnings data for the non-STEM graduates. Median industry earnings for non-STEM graduates were generally lower than industry earnings for graduates in STEM fields, with the lowest median wage in a top 3 industry of just under $19,000 for graduates with less than a bachelor's degree working in Retail Trade to just under $35,000 for terminal degree graduates working in Public Administration. The highest median industry earnings for non-STEM graduates ranged from over $27,000 for bachelor's graduates working in Educational Services to $59,000 for terminal degree graduates working in Educational Services.

Figure 4.09 Share of non-STEM graduates' employment in top 3 primary industries by degree level

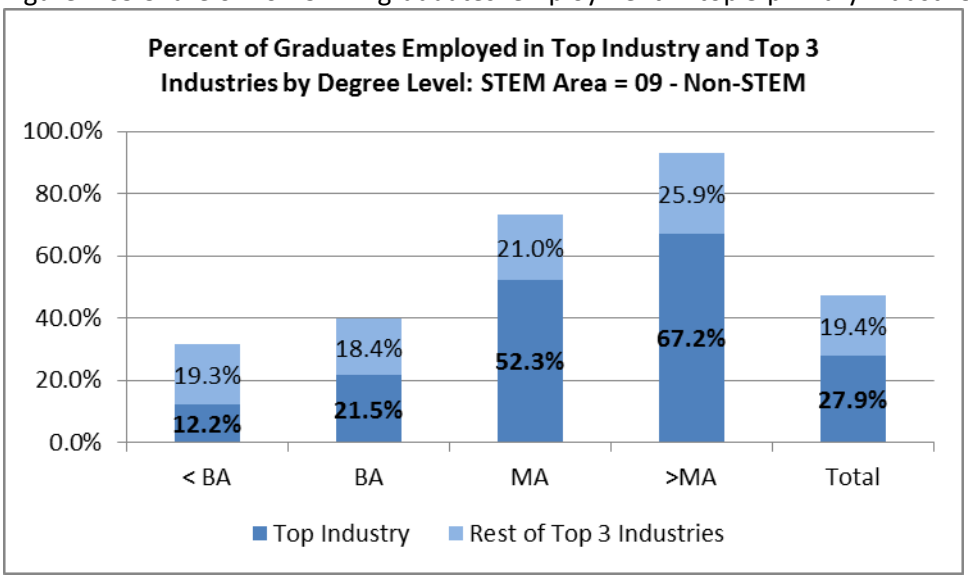


Table 4.09 Top three industries where graduates with Non- STEM majors were employed – by degree level

STEM Field and Degree Level	Industry Name (NAICS)	# Grads Matched in Wages	Average Wage for NAICS ($$)	Median Wage for NAICS ($$)	Range of Wage for NAICS ($$)	Average Total Wage ($$)	Median Total Wage ($$)	Range of Total Wage ($$)	Median NAICS Wage as % of Median Total Wage
09-NOTSTEM									
Less than BA/BS	62 - Health Care and Social Assistance	1,024	22,300	20,023	89,130	24,252	21,856	81,066	91.6%
	92 - Public Administration	823	32,811	28,825	106,071	34,898	30,330	99,263	95.0%
	44 - Retail Trade	801	21,288	18,910	126,265	23,070	20,790	116,926	91.0%
	Other Industries	5,768	25,702	21,993	184,442	28,011	24,195	175,268	90.9%
BA/BS	61 - Educational Services	4,567	26,237	27,242	98,351	28,092	28,318	90,047	96.2%
	62 - Health Care and Social Assistance	1,969	21,373	20,053	125,604	24,313	22,463	117,253	89.3%
	52 - Finance and Insurance	1,940	26,646	25,139	153,539	29,583	28,177	145,685	89.2%
	Other Industries	12,799	25,307	22,725	352,528	28,324	25,681	342,563	88.5%
MASTERS	61 - Educational Services	4,426	39,973	39,474	246,860	40,837	40,000	239,089	98.7%
	54 - Professional, Scientific, & Tech Services	967	46,637	44,072	253,813	48,595	44,785	244,618	98.4%
	62 - Health Care and Social Assistance	813	32,762	29,777	203,729	35,649	31,867	229,977	93.4%
	Other Industries	2,257	43,445	36,265	298,905	46,503	38,760	290,700	93.6%
MORE THAN MASTERS	61 - Educational Services	1,075	62,000	59,015	228,655	62,840	60,013	221,070	98.3%
	54 - Professional, Scientific, & Tech Services	281	55,766	49,485	91,106	56,692	50,202	102,690	98.6%
	92 - Public Administration	134	34,713	35,825	104,670	36,084	36,234	99,421	98.9%
	Other Industries	110	48,394	46,107	117,702	51,275	48,885	108,371	94.3%

Summary

Identifying the industries that hire college graduates and the degree to which graduate employment is concentrated in those industries provides useful information for college and economic development policy makers, as well as for current and prospective students. Generally, the analysis of "primary industry" employment among working graduates who met the full-time worker criteria revealed that a limited set of industries appear to be the most common employers of recent college graduates in Missouri. These include Health Services; Professional, Scientific, and Technical Services; and Educational Services. Interestingly, service oriented industries that account for large shares of total employment in Missouri (Retail Trade and Accommodation and Food Services), generally were not among the top industries for college graduates working enough to meet the full-time worker criteria.[7]

Figure 4.10 shows median industry wages for the top primary industry, by STEM area and degree level. In general, earnings were responsive to degree levels, with higher level degrees compensated with higher wages. This was especially evident for the non-STEM graduates and graduates with degrees in Biological / Health Sciences majors. One key exception to higher returns to higher degrees was observed in the data. In all STEM fields except Biological / Health Sciences, median industry earnings for terminal degree earners were lower than median earnings for graduates with master's degrees. This probably is partially explained by the focus on first year earnings when many terminal degree graduates may have accepted paid post-doctoral or residency appointments which pay less than other positions held later in these professionals' careers.

Figure 4.10 Median earnings in top primary industry by STEM area and degree level

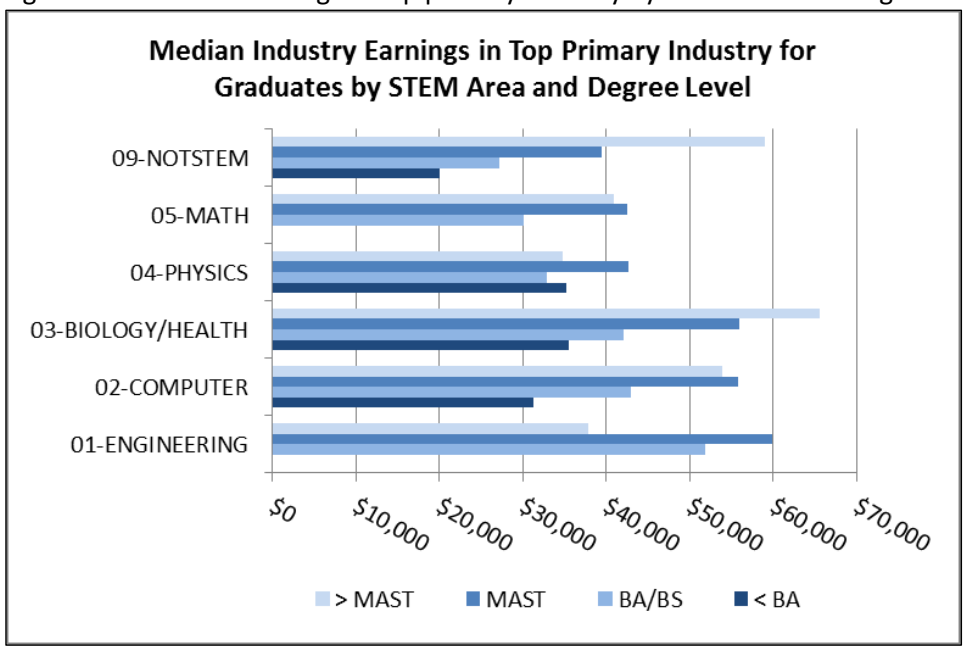


Figure 4.10 also illustrates an apparent wage premium for completing a degree in a STEM field. Median industry earnings for all STEM fields were higher than median industry earnings for non-STEM graduates at all degree levels except the post-masters group. Wage premiums for STEM degrees were between $10,000 and

[7] The Retail Trade and Accommodation and Food Services industries are more frequently among the top 3 primary industries when the full-time worker criteria are not used to limit the sample of graduates in the analyses. See Appendix Table A3 for those results.

$15,000 for certificate and associate's degree graduates; between $2000 and more than $20,000 for bachelor's and master's degree graduates.

Analysis 5: Wage Premiums by Degree Level, Institutional Selectivity, and STEM Focus
In the final analysis conducted for this project, the unique contribution of degree level and type to wages was estimated using multiple regression techniques. The analytical sample used for the regressions included all graduates not observed in college after receiving their last degree and who met the following additional criteria:

- were between 18 and 70 years of age;
- were observed in wage data all 4 quarters following their last graduation;
- had total wages between $14,000 and $500,000; and,
- had data for cumulative GPA and total credit hours earned from term registration records for their last degree.

There were just under 52,000 graduates included in this sample. The majority of the graduates excluded from the total pool of "full-time worker" graduates found in Missouri wage data were removed from the sample because GPA and credit hour data were missing.

The outcome variable in the model was total first year earnings and the explanatory variables included:

- graduate demographic characteristics (gender, race and age);
- year graduated;
- cumulative GPA and total credit hours completed associated with last degree or certificate;
- degree level (six levels from less than associate degree to professional degree);
- whether or not the degree was in a STEM field; and,
- selectivity of the institution that awarded the degree.

Graduate gender, race, and age were included in the model to control for graduate characteristics that have been shown to be predictive of employment and earnings. Age was particularly important as it is highly correlated with prior labor market experience. In addition, the year graduated was included to capture temporal labor market conditions, i.e., whether graduation and availability to the state labor market occurred before or during the recession of 2008 or during the early stages of recovery. Information about college GPA associated with the last degree earned was included as an indicator of the overall ability (total human capital) of graduates, which also influences employers' hiring and compensation decisions. A measure based on total credit hours earned was included to examine whether earnings of graduates with otherwise similar degree characteristics differed based on differences in credit hours completed.

Institutional selectivity included three possible levels; highly selective, moderately selective, or open enrollment. This allows examining if there are larger wage premiums for graduates from more selective colleges. A set of 18 variables was created based on degree level, STEM status, and institutional selectivity. For example, all bachelor's degrees in the sample could be coded STEM or non-STEM and from highly selective, moderately selective, or open enrollment institutions. This created six different variables to reflect the types of bachelor's degrees graduates could have earned. Cumulative GPA values for graduates were interacted with degree type which allows estimating the contribution of GPA to wages within each type of degree.

The primary purpose for fitting the regression model was to estimate wage premiums for the predominant kinds of certificates and degrees that can be earned from Missouri's public colleges and universities after controlling for observable characteristics of the graduates and the year in which they earned their degrees.
Table 5.1: Estimated Impact of non-Degree Related Predictor Variables on Post-Graduation Earnings

Variable	Regression Coefficient[a]
Female[b]	$ -4,596
Hispanic[c]	$ -1,262
Year 2008[d]	$ 417
Year 2009[d]	$ -484
Year 2010[d]	$ -1,156
Year 2011[d]	$ -987

[a]Regression coefficients for variables that were not statistically significant predictors of earnings are not shown in this summary table. See appendix B for details about the regression model results.
[b] Compared to Male graduates
[c] Compared to Black graduates
[d] Compared to graduates from 2007

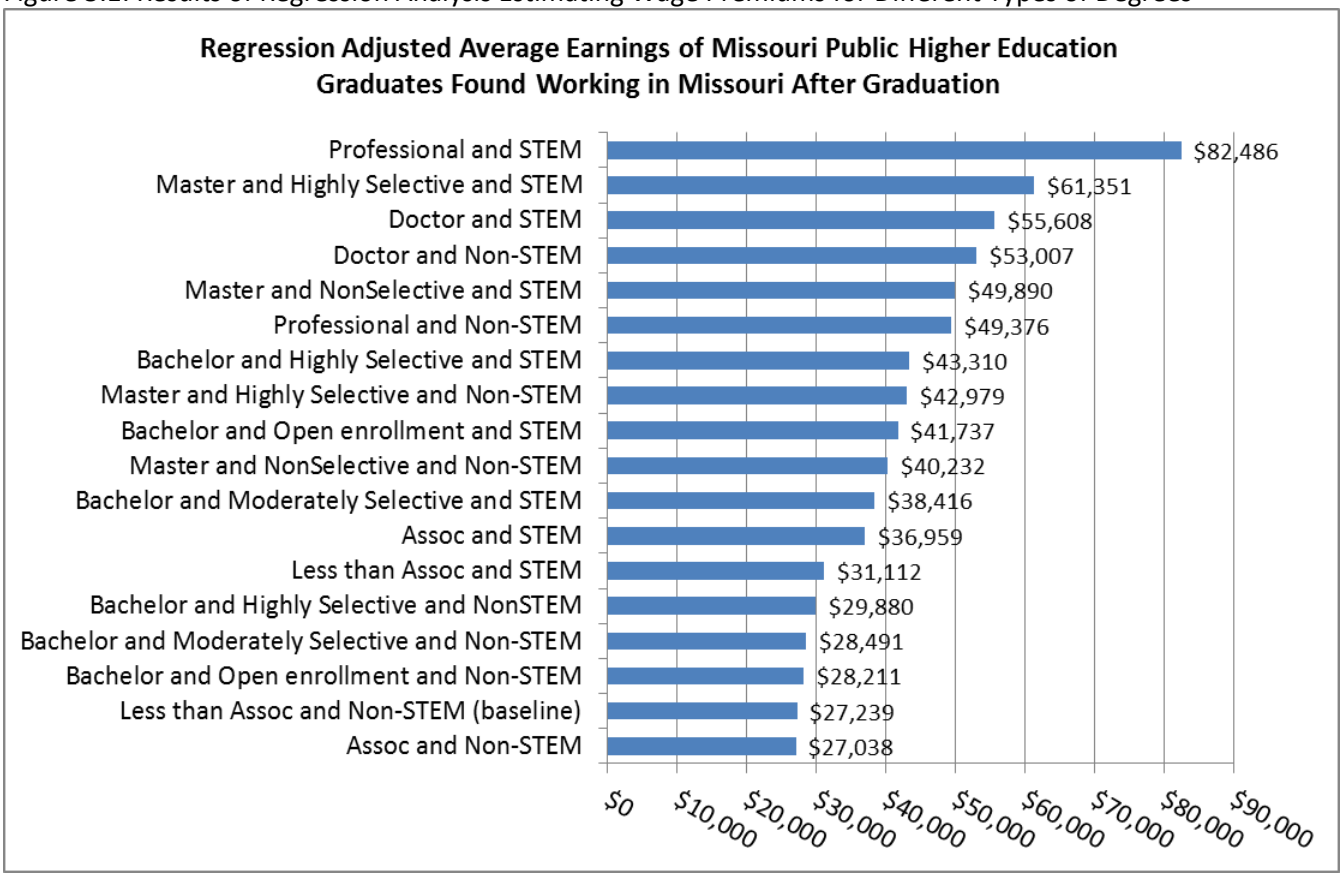
Table 5.1 summarizes the regression results for the graduates' demographic characteristics and the time trend controls. The statistically significant regression coefficients indicate that after controlling for all other variables in the model, including type of degree and cumulative GPA:

- females, on average, earn nearly $4600 less than males;
- only Hispanic graduates earn less than Black graduates and the amount is over $1200 per year;
- graduates in 2008 earned just over $400 more than graduates from 2007; and,
- graduates in 2009 through 2011 earned less than graduates from 2007, with the biggest difference in 2010 when graduates earned more than $1150 less than graduates in 2007.

The wage premium results from this analysis are presented in Figure 5.1 as regression-adjusted average earnings for each of the degree categories described above.[8] The regression-adjusted average earnings are presented in ascending order and the results indicate that degree level is not the most important determinant of first year earnings after controlling for other variables reflecting graduate characteristics and the year graduated. Working from the bottom of the chart to the top reveals that the lowest average wage was observed for graduates with non-STEM associate degrees, a group dominated by general liberal arts majors. Interestingly, non-STEM bachelor degree recipients, regardless of institutional selectivity, had lower regression adjusted first year earnings than certificate and associate degree holders with STEM majors. Moreover, there is a lot of degree level and selectivity mixing in the middle of the chart. In general it appears that graduates with STEM majors and lower level degrees had higher adjusted mean earnings than graduates with non-STEM majors from more selective institutions or higher level non-STEM degrees. The top of the chart is primarily comprised of graduates with terminal degrees, though those with STEM majors occupy four of the top six spots, including graduates with master's degrees in STEM fields from highly selective institutions.

[8] Mean values for all of the variables used in the model and regression results are presented in Appendix B.

Figure 5.1: Results of Regression Analysis Estimating Wage Premiums for Different Types of Degrees



Concluding Comment

This WDQI project focused on using combined data from Missouri's public higher education system and the state's unemployment insurance data files to examine employment and earnings outcomes for college graduates, specifically relationships between the majors students choose to pursue in college and employment outcomes. Generally, records from the different data systems and from different data sets within systems were able to be matched at high rates using the person identifiers created for the project. This provided thousands of matched records for use in the analyses conducted for this report. The results suggest that such analyses can provide information useful to prospective college students and institutional and state level policy-makers whose work is impacted by relationships between educational attainment and labor market outcomes.

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Contents of Appendices

Table A1: Public Higher Education Completions by Degree Level and Year with Results from Matching to Missouri Wage Data

Year	# Degrees	# Not in College[a]	% Avail for Matching	# In Wage Data	% in Wage Data	Average Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Average Wage ($$)	Median Wage ($$)
1-Cert											
2007	1,287	921	71.6%	754	81.9%	27,985	23,867	602	65.4%	33,525	27,429
2008	1,234	900	72.9%	736	81.8%	23,437	22,956	551	61.2%	29,246	27,014
2009	1,269	929	73.2%	760	81.8%	23,211	21,010	556	59.8%	29,648	26,034
2010	1,522	1,059	69.6%	847	80.0%	22,218	21,000	612	57.8%	28,441	26,076
2011	1,855	1,064	57.4%	820	77.1%	16,849	13,244	426	40.0%	26,535	23,061
Total	7,167	4,873	68.0%	3,917	80.4%	22,626	20,422	2,747	56.4%	29,666	26,119
2-Assoc											
2007	6,647	5,113	76.9%	4,105	80.3%	22,858	20,202	2,838	55.5%	30,407	27,175
2008	7,089	5,500	77.6%	4,402	80.0%	22,519	19,833	3,018	54.9%	30,161	27,078
2009	7,566	5,944	78.6%	4,906	82.5%	21,800	18,325	3,154	53.1%	30,710	27,302
2010	9,035	7,309	80.9%	5,893	80.6%	20,095	16,537	3,604	49.3%	29,043	25,777
2011	9,884	7,896	79.9%	6,183	78.3%	13,359	10,008	2,517	31.9%	24,291	20,477
Total	40,221	31,762	79.0%	25,489	80.2%	19,653	15,962	15,131	47.6%	29,079	25,483
3-Bach											
2007	15,393	13,830	89.8%	10,095	73.0%	22,798	21,546	7,268	52.6%	29,607	27,098
2008	15,820	14,033	88.7%	10,237	72.9%	23,221	21,713	7,260	51.7%	30,576	27,898
2009	17,078	14,953	87.6%	10,856	72.6%	21,441	19,113	7,275	48.7%	29,242	26,128
2010	18,374	16,028	87.2%	11,557	72.1%	20,565	17,912	7,455	46.5%	28,836	25,660
2011	19,063	18,302	96.0%	12,635	69.0%	14,751	11,731	5,929	32.4%	24,747	21,244
Total	85,728	77,146	90.0%	55,380	71.8%	20,308	17,726	35,187	45.6%	28,749	25,640
4-Grad Cert											
2007	53	43	81.1%	20	46.5%	37,979	34,912	16	37.2%	46,387	43,156
2008	78	60	76.9%	25	41.7%	74,440	41,668	20	33.3%	65,564	49,547
2009	129	86	66.7%	44	51.2%	55,962	54,699	39	45.3%	62,329	58,086
2010	228	125	54.8%	57	45.6%	44,198	35,708	47	37.6%	52,912	41,142
2011	290	222	76.6%	107	48.2%	27,379	24,638	76	34.2%	36,696	32,227
Total	778	536	68.9%	253	47.2%	41,627	32,789	198	36.9%	49,293	40,707

Table A1: Public Higher Education Completions by Degree Level and Year with Results from Matching to Missouri Wage Data											
Year	# Degrees	# Not in College[a]	% Avail for Matching	# In Wage Data	% in Wage Data	Average Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Average Wage ($$)	Median Wage ($$)
5-Mast											
2007	4,748	4,271	90.0%	2,729	63.9%	36,752	34,985	2,362	55.3%	41,765	37,708
2008	5,089	4,588	90.2%	2,829	61.7%	39,551	39,107	2,438	53.1%	44,959	41,469
2009	5,654	5,077	89.8%	3,125	61.6%	39,424	38,176	2,702	53.2%	44,584	40,663
2010	5,807	5,347	92.1%	3,284	61.4%	37,957	37,126	2,801	52.4%	43,654	39,487
2011	6,372	6,178	97.0%	3,521	57.0%	29,762	23,396	2,704	43.8%	36,104	31,691
Total	27,670	25,461	92.0%	15,488	60.8%	36,469	35,484	13,007	51.1%	42,179	38,723
6-Ed Spec											
2007	181	157	86.7%	139	88.5%	59,202	58,379	137	87.3%	60,040	58,433
2008	185	147	79.5%	137	93.2%	63,079	62,050	136	92.5%	63,520	62,409
2009	264	217	82.2%	193	88.9%	59,727	58,243	188	86.6%	61,214	59,228
2010	232	205	88.4%	181	88.3%	59,971	57,224	178	86.8%	60,955	57,643
2011	246	239	97.2%	216	90.4%	45,619	45,206	204	85.4%	47,963	46,693
Total	1,108	965	87.1%	866	89.7%	56,705	55,972	843	87.4%	58,134	56,638
7-Doc/Prof											
2007	1,223	1,197	97.9%	588	49.1%	47,418	41,452	514	42.9%	53,552	43,327
2008	1,265	1,239	97.9%	622	50.2%	51,117	44,106	534	43.1%	58,760	46,278
2009	1,246	1,226	98.4%	607	49.5%	52,377	44,381	516	42.1%	59,015	45,959
2010	1,327	1,295	97.6%	662	51.1%	51,964	45,536	558	43.1%	60,693	49,744
2011	1,401	1,396	99.6%	691	49.5%	29,944	23,645	530	38.0%	37,291	28,201
Total	6,462	6,353	98.3%	3,170	49.9%	46,234	40,884	2,652	41.7%	53,916	44,631
0-Misc											
2010	52	41	78.8%	35	85.4%	33,119	34,708	33	80.5%	34,894	34,923
2011	62	54	87.1%	47	87.0%	24,728	25,032	37	68.5%	29,343	31,695
Total	114	95	83.3%	82	86.3%	28,310	32,487	70	73.7%	31,960	34,199
TOTALS	169,248	147,191	87.0%	104,645	71.1%			69,835	47.4%		

[a] Not in a public Missouri college or university

[b] In 4 consecutive quarters after graduation with annual earnings between $14,000 and $499,999

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earn-ings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
Certificates												
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	2,646	1,550	59%	1,322	85%	22,966	22,457	814	53%	30,160	28,566
43	SECURITY AND PROTECTIVE SERVICES	1,027	758	74%	694	92%	21,582	20,644	420	55%	28,479	26,618
15	ENGINEERING TECHNOLOGIES/TECHNICIANS	792	586	74%	438	75%	28,447	21,870	268	46%	40,403	34,349
49	TRANSPORTATION AND MATERIALS MOVING	533	529	99%	394	74%	20,232	19,035	201	38%	28,791	26,163
52	BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES	476	329	69%	230	70%	17,385	14,072	102	31%	27,655	23,765
47	MECHANIC AND REPAIR TECHNOLOGIES/TECHNICIANS	293	246	84%	203	83%	21,415	19,177	115	47%	30,088	25,333
19	FAMILY AND CONSUMER SCIENCES/HUMAN SCIENCES	228	102	45%	71	70%	13,073	11,533	26	25%	21,728	19,939
11	COMPUTER AND INFORMATION SCIENCES AND SUPPORT SERVICES	190	101	53%	69	68%	26,928	21,237	34	34%	39,423	33,590
22	LEGAL PROFESSIONS AND STUDIES	169	145	86%	121	83%	25,477	25,809	73	50%	33,737	31,140
12	PERSONAL AND CULINARY SERVICES	151	114	75%	56	49%	22,359	19,940	31	27%	34,582	29,731
48	PRECISION PRODUCTION	149	118	79%	101	86%	18,601	18,781	53	45%	28,239	28,224
16	FOREIGN LANGUAGES, LITERATURES, AND LINGUISTICS	118	43	36%	29	67%	18,232	12,749	11	26%	35,544	29,168

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earnings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
24	LIBERAL ARTS AND SCIENCES, GENERAL STUDIES AND HUMANITIES	97	21	22%	13	62%	13,142	7,528	2	10%	39,036	39,036
50	VISUAL AND PERFORMING ARTS	70	48	69%	36	75%	17,772	14,801	22	46%	23,857	25,108
01	AGRICULTURE, AGRICULTURE OPERATIONS, AND RELATED SCIENCES	69	58	84%	42	72%	21,026	14,781	19	33%	37,368	27,662
46	CONSTRUCTION TRADES	63	47	75%	NR	HIGH	55,277	59,076	NR	HIGH	64,557	62,270
44	PUBLIC ADMINISTRATION AND SOCIAL SERVICE PROFESSIONS	34	25	74%	18	72%	17,929	15,432	9	36%	27,336	26,413
41	SCIENCE TECHNOLOGIES/TECHNICIANS	18	13	72%	NR	NR	12,292	7,093	NR	NR	26,519	26,519
10	COMMUNICATIONS TECHNOLOGIES/TECHNICIANS AND SUPPORT SERVICES	15	14	93%	8	57%	16,108	17,459	3	21%	22,053	20,666
45	SOCIAL SCIENCES	9	8	89%	NR	NR	19,545	15,710	NR	NR	20,470	20,470
09	COMMUNICATION, JOURNALISM, AND RELATED PROGRAMS	8	7	88%	NR	NR	16,427	12,785	NR	NR	22,785	24,426
13	EDUCATION	5	5	100%	NR	NR	9,464	7,928	NR	NR	17,528	17,528
14	ENGINEERING	4	4	100%	NR	NR	NR	NR	NR	NR	NR	NR
30	MULTI/INTERDISCIPLINARY STUDIES	2	1	50%	NR	NR	NR	NR	NR	NR	NR	NR
23	ENGLISH LANGUAGE AND LITERATURE/LETTERS	1	1	100%	NR	NR	NR	NR	NR	NR	NR	NR
Total Certificates		**7,167**	**4,873**	**68%**	**3,845**	**79%**	**22,626**	**20,422**	**2,234**	**46%**	**31,327**	**28,012**

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earn-ings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
Associates Degrees												
24	LIBERAL ARTS AND SCIENCES, GENERAL STUDIES AND HUMANITIES	21,014	15,358	73%	11,795	77%	13,882	10,758	4644	30%	24,908	21,082
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	7,121	6,350	89%	5,676	89%	31,925	33,428	4044	64%	38,543	38,648
52	BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES	2,302	1,854	81%	1,490	80%	18,628	16,543	844	46%	26,332	22,481
15	ENGINEERING TECHNOLOGIES/TECHNICIANS	1,212	1,015	84%	815	80%	24,442	21,024	480	47%	34,235	29,837
43	SECURITY AND PROTECTIVE SERVICES	1,113	911	82%	778	85%	26,683	22,059	484	53%	36,707	31,379
47	MECHANIC AND REPAIR TECHNOLOGIES/TECHNICIANS	1,055	950	90%	809	85%	20,921	20,462	490	52%	27,733	25,662
11	COMPUTER AND INFORMATION SCIENCES AND SUPPORT SERVICES	1,036	864	83%	690	80%	21,769	18,505	397	46%	30,697	27,333
13	EDUCATION	982	753	77%	635	84%	8,781	7,329	141	19%	18,709	16,412
19	FAMILY AND CONSUMER SCIENCES/HUMAN SCIENCES	834	635	76%	509	80%	14,980	14,087	275	43%	21,128	20,138
50	VISUAL AND PERFORMING ARTS	511	384	75%	281	73%	14,924	12,529	121	32%	23,573	20,610
12	PERSONAL AND CULINARY SERVICES	483	448	93%	383	85%	17,673	16,744	222	50%	24,479	22,356
22	LEGAL PROFESSIONS AND STUDIES	372	305	82%	244	80%	21,010	21,419	155	51%	27,801	26,360

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earn-ings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
01	AGRICULTURE, AGRICULTURE OPERATIONS, AND RELATED SCIENCES	337	294	87%	197	67%	17,529	15,362	102	35%	26,300	24,210
46	CONSTRUCTION TRADES	297	289	97%	263	91%	25,664	21,914	138	48%	37,163	36,486
44	PUBLIC ADMINISTRATION AND SOCIAL SERVICE PROFESSIONS	277	240	87%	171	71%	16,011	14,463	89	37%	25,119	24,197
10	COMMUNICATIONS TECHNOLOGIES/TECHNICIANS AND SUPPORT SERVICES	268	248	93%	207	83%	12,293	11,096	86	35%	20,018	18,925
30	MULTI/INTERDISCIPLINARY STUDIES	262	254	97%	98	39%	3,974	2,489	3	1%	24,220	22,399
48	PRECISION PRODUCTION	208	180	87%	157	87%	29,081	25,780	105	58%	35,399	30,878
41	SCIENCE TECHNOLOGIES/TECHNICIANS	159	150	94%	85	57%	25,787	25,448	42	28%	38,071	33,028
16	FOREIGN LANGUAGES, LITERATURES, AND LINGUISTICS	133	109	82%	85	78%	21,575	21,556	51	47%	27,948	25,585
14	ENGINEERING	97	57	59%	37	65%	17,084	6,227	13	23%	39,615	31,762
04	ARCHITECTURE AND RELATED SERVICES	52	40	77%	35	88%	18,872	12,849	16	40%	34,102	32,204
09	COMMUNICATION, JOURNALISM, AND RELATED PROGRAMS	37	32	86%	22	69%	10,849	8,686	6	19%	22,288	23,063
42	PSYCHOLOGY	18	11	61%	NR	NR	13,868	11,420	NR	NR	19,794	16,875
03	NATURAL RESOURCES AND CONSERVATION	15	11	73%	6	55%	9,164	9,879	1	9%	21,118	21,118
32	BASIC SKILLS	9	7	78%	NR	NR	19,823	14,305	NR	NR	27,012	25,312

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earn-ings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
26	BIOLOGICAL AND BIOMEDICAL SCIENCES	7	6	86%	NR	NR	7,663	8,085	NR	NR	NR	NR
??	UNKNOWN	7	5	71%	NR	NR	3,187	2,476	NR	NR	NR	NR
27	MATHEMATICS AND STATISTICS	2	1	50%	NR	NR	NR	NR	NR	NR	NR	NR
40	PHYSICAL SCIENCES	1	1	100%	NR	NR	NR	NR	NR	NR	NR	NR
Total Associates Degrees		**40,221**	**31,762**	**79%**	**25,468**	**80%**	**19,653**	**15,962**	**12,956**	**41%**	**30,468**	**27,291**
Bachelors Degrees												
52	BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES	17,804	16,471	93%	12,442	76%	22,168	20,998	7184	44%	30,708	28,751
13	EDUCATION	9,746	8,555	88%	7,371	86%	19,974	18,722	4548	53%	26,981	27,279
09	COMMUNICATION, JOURNALISM, AND RELATED PROGRAMS	6,388	6,018	94%	3,873	64%	15,316	14,138	1711	28%	24,892	23,544
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	6,062	5,455	90%	4,405	81%	34,459	38,173	2915	53%	44,379	43,224
14	ENGINEERING	4,921	4,446	90%	2,232	50%	34,395	37,103	1300	29%	48,839	50,265
45	SOCIAL SCIENCES	4,658	4,159	89%	2,935	71%	15,523	13,089	1276	31%	25,925	23,312
42	PSYCHOLOGY	4,497	3,935	88%	2,920	74%	14,661	13,443	1317	33%	23,384	21,761
26	BIOLOGICAL AND BIOMEDICAL SCIENCES	4,143	3,488	84%	2,299	66%	13,634	11,017	869	25%	25,070	23,151
50	VISUAL AND PERFORMING ARTS	3,226	2,964	92%	2,043	69%	12,238	10,509	740	25%	22,049	20,552
24	LIBERAL ARTS AND SCIENCES, GENERAL STUDIES AND HUMANITIES	3,002	2,612	87%	1,728	66%	20,517	16,536	883	34%	31,539	27,257

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earn-ings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
19	FAMILY AND CONSUMER SCIENCES/HUMAN SCIENCES	2,531	2,369	94%	1,799	76%	16,458	15,919	935	39%	23,800	22,572
23	ENGLISH LANGUAGE AND LITERATURE/LETTERS	2,257	1,962	87%	1,371	70%	13,132	11,228	532	27%	23,170	21,156
01	AGRICULTURE, AGRICULTURE OPERATIONS, AND RELATED SCIENCES	2,022	1,798	89%	1,166	65%	18,452	17,339	592	33%	27,805	26,002
43	SECURITY AND PROTECTIVE SERVICES	2,014	1,773	88%	1,274	72%	17,929	17,230	664	37%	26,398	24,731
31	PARKS, RECREATION, LEISURE, AND FITNESS STUDIES	1,900	1,738	91%	1,173	67%	14,185	12,868	488	28%	23,355	21,915
11	COMPUTER AND INFORMATION SCIENCES AND SUPPORT SERVICES	1,727	1,597	92%	1,132	71%	30,948	30,338	705	44%	41,595	40,835
15	ENGINEERING TECHNOLOGIES/TECHNICIANS	1,469	1,333	91%	913	68%	27,487	25,879	552	41%	37,356	36,451
54	HISTORY (NEW) Instructional programs that focus on the study and interpretation of past events, institutions, issues, and cultures	1,357	1,187	87%	798	67%	13,098	10,568	307	26%	23,512	20,628
40	PHYSICAL SCIENCES	1,315	1,117	85%	617	55%	15,313	10,834	235	21%	29,083	27,636
44	PUBLIC ADMINISTRATION AND SOCIAL SERVICE PROFESSIONS	951	851	89%	690	81%	18,207	19,408	393	46%	25,464	25,196
16	FOREIGN LANGUAGES, LITERATURES, AND LINGUISTICS	850	739	87%	472	64%	12,887	10,318	158	21%	24,364	21,670
30	MULTI/INTERDISCIPLINARY STUDIES	847	792	94%	543	69%	15,684	13,209	239	30%	26,275	22,677

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earn-ings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
27	MATHEMATICS AND STATISTICS	598	500	84%	306	61%	17,891	13,125	124	25%	33,274	30,126
03	NATURAL RESOURCES AND CONSERVATION	528	483	91%	357	74%	14,586	12,593	157	33%	23,383	22,116
38	PHILOSOPHY AND RELIGIOUS STUDIES	401	340	85%	213	63%	10,972	7,559	72	21%	21,779	19,195
05	AREA, ETHNIC, CULTURAL, AND GENDER STUDIES	289	278	96%	164	59%	14,909	11,073	62	22%	28,898	25,571
04	ARCHITECTURE AND RELATED SERVICES	81	68	84%	53	78%	14,682	11,767	19	28%	25,960	21,938
10	COMMUNICATIONS TECHNOLOGIES/TECHNICIANS AND SUPPORT SERVICES	56	46	82%	37	80%	16,730	15,413	18	39%	27,819	29,596
34	HEALTH-RELATED KNOWLEDGE AND SKILLS	34	29	85%	24	83%	15,870	12,763	11	38%	25,321	22,576
12	PERSONAL AND CULINARY SERVICES	12	12	100%	NR	NR	18,047	18,019	NR	NR	21,588	19,072
36	LEISURE AND RECREATIONAL ACTIVITIES	12	8	67%	NR	NR	18,346	18,535	NR	NR	22,550	20,552
49	TRANSPORTATION AND MATERIALS MOVING	12	9	75%	NR	NR	16,841	15,910	NR	NR	27,123	27,123
39	THEOLOGY AND RELIGIOUS VOCATIONS	8	6	75%	NR	NR	20,366	19,265	NR	NR	30,904	30,904
41	SCIENCE TECHNOLOGIES/TECHNICIANS	5	3	60%	NR	NR	3,583	3,583	NR	NR	NR	NR
22	LEGAL PROFESSIONS AND STUDIES	4	4	100%	NR	NR	NR	NR	NR	NR	NR	NR
Total Bachelors Degrees		**85,728**	**77,146**	**90%**	**55,350**	**72%**	**20,308**	**17,726**	**29,025**	**38%**	**30,510**	**27,764**

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earnings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
Graduates Certificates												
14	ENGINEERING	237	132	56%	29	22%	70,774	70,581	18	14%	90,069	85,458
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	162	124	77%	62	50%	53,487	32,957	24	19%	88,594	79,481
15	ENGINEERING TECHNOLOGIES/TECHNICIANS	55	26	47%	9	35%	41,983	33,099	2	8%	70,128	70,128
13	EDUCATION	54	38	70%	24	63%	26,035	22,724	12	32%	39,688	41,355
44	PUBLIC ADMINISTRATION AND SOCIAL SERVICE PROFESSIONS	51	38	75%	28	74%	39,303	35,711	20	53%	49,390	41,592
11	COMPUTER AND INFORMATION SCIENCES AND SUPPORT SERVICES	36	23	64%	10	43%	54,813	54,927	7	30%	68,724	59,866
52	BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES	35	30	86%	16	53%	33,129	32,463	11	37%	42,129	37,820
30	MULTI/INTERDISCIPLINARY STUDIES	29	27	93%	7	26%	24,708	30,272	5	19%	31,840	35,289
23	ENGLISH LANGUAGE AND LITERATURE/LETTERS	26	20	77%	NR	NR	31,751	29,449	NR	NR	41,657	40,777
45	SOCIAL SCIENCES	21	17	81%	10	59%	27,576	26,905	6	35%	31,550	28,196
42	PSYCHOLOGY	17	11	65%	NR	NR	33,730	34,534	NR	NR	42,235	38,932
09	COMMUNICATION, JOURNALISM, AND RELATED PROGRAMS	10	10	100%	NR	NR	24,432	27,569	NR	NR	37,835	35,419
43	SECURITY AND PROTECTIVE SERVICES	10	10	100%	NR	NR	19,345	15,790	NR	NR	31,187	35,760
50	VISUAL AND PERFORMING ARTS	10	10	100%	NR	NR	2,539	1,520	NR	NR	NR	NR

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earnings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
05	AREA, ETHNIC, CULTURAL, AND GENDER STUDIES	8	7	88%	NR	NR	19,945	16,519	NR	NR	29,285	29,285
19	FAMILY AND CONSUMER SCIENCES/HUMAN SCIENCES	5	5	100%	NR	NR	48,535	55,292	NR	NR	45,155	51,907
40	PHYSICAL SCIENCES	5	4	80%	NR	NR	7,937	7,937	NR	NR	NR	NR
26	BIOLOGICAL AND BIOMEDICAL SCIENCES	4	3	75%	NR	NR	NR	NR	NR	NR	NR	NR
27	MATHEMATICS AND STATISTICS	2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
38	PHILOSOPHY AND RELIGIOUS STUDIES	1	1	100%	NR	NR	NR	NR	NR	NR	NR	NR
Total Graduates Certificates		**778**	**536**	**69%**	**195**	**36%**	**41,627**	**32,789**	**132**	**25%**	**58,449**	**46,182**
Masters Degrees										**#DIV/0!**		
13	EDUCATION	8,552	7,551	88%	5,799	77%	33,484	35,701	4200	56%	40,050	39,442
52	BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES	5,219	5,085	97%	3,271	64%	41,925	38,760	2175	43%	52,160	45,027
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	2,447	2,378	97%	1,662	70%	50,646	48,078	1235	52%	59,650	56,040
14	ENGINEERING	2,292	2,107	92%	419	20%	55,396	57,128	292	14%	70,231	66,554
44	PUBLIC ADMINISTRATION AND SOCIAL SERVICE PROFESSIONS	1,853	1,790	97%	1,330	74%	28,759	29,801	888	50%	36,549	34,123
11	COMPUTER AND INFORMATION SCIENCES AND SUPPORT SERVICES	960	920	96%	207	23%	45,877	49,477	139	15%	59,617	55,968
09	COMMUNICATION, JOURNALISM, AND RELATED	686	665	97%	243	37%	23,927	22,693	129	19%	36,489	34,800

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earn-ings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
23	ENGLISH LANGUAGE AND LITERATURE/LETTERS	604	542	90%	360	66%	24,643	21,234	208	38%	36,812	35,209
45	SOCIAL SCIENCES	596	496	83%	253	51%	23,862	20,583	126	25%	36,337	32,981
50	VISUAL AND PERFORMING ARTS	594	550	93%	261	47%	16,792	11,489	92	17%	32,203	32,513
26	BIOLOGICAL AND BIOMEDICAL SCIENCES	509	463	91%	263	57%	42,189	29,345	161	35%	58,374	38,647
15	ENGINEERING TECHNOLOGIES/TECHNICIANS	429	412	96%	136	33%	44,285	45,442	83	20%	59,630	58,303
40	PHYSICAL SCIENCES	335	254	76%	93	37%	29,328	28,000	52	20%	42,047	39,049
42	PSYCHOLOGY	319	210	66%	129	61%	25,358	23,982	77	37%	35,210	33,304
54	HISTORY (NEW) Instructional programs that focus on the study and interpretation of past events, institutions, issues, and cultures	311	273	88%	189	69%	28,170	27,021	116	42%	41,007	39,498
30	MULTI/INTERDISCIPLINARY STUDIES	263	254	97%	99	39%	28,984	30,733	60	24%	37,570	35,717
27	MATHEMATICS AND STATISTICS	253	206	81%	99	48%	30,917	32,574	57	28%	44,342	42,898
43	SECURITY AND PROTECTIVE SERVICES	230	224	97%	122	54%	30,815	28,974	82	37%	39,298	36,408
22	LEGAL PROFESSIONS AND STUDIES	194	190	98%	64	34%	35,365	24,588	29	15%	60,770	48,991
01	AGRICULTURE, AGRICULTURE OPERATIONS, AND RELATED SCIENCES	184	152	83%	59	39%	29,573	31,263	41	27%	37,675	37,545
16	FOREIGN LANGUAGES, LITERATURES, AND LINGUISTICS	168	143	85%	81	57%	23,611	23,946	45	31%	34,752	33,287

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earn-ings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
49	TRANSPORTATION AND MATERIALS MOVING	150	143	95%	64	45%	29,585	14,563	28	20%	55,419	44,647
38	PHILOSOPHY AND RELIGIOUS STUDIES	126	109	87%	60	55%	13,716	11,020	21	19%	25,723	23,109
19	FAMILY AND CONSUMER SCIENCES/HUMAN SCIENCES	112	97	87%	51	53%	25,052	25,426	29	30%	34,706	33,648
31	PARKS, RECREATION, LEISURE, AND FITNESS STUDIES	85	82	96%	53	65%	25,084	24,645	26	32%	38,576	33,885
25	LIBRARY SCIENCE	66	60	91%	53	88%	37,482	39,700	37	62%	43,374	43,280
03	NATURAL RESOURCES AND CONSERVATION	59	55	93%	36	65%	23,376	22,963	21	38%	35,040	33,368
24	LIBERAL ARTS AND SCIENCES, GENERAL STUDIES AND HUMANITIES	57	42	74%	25	60%	32,396	30,951	19	45%	39,488	39,326
21	TECHNOLOGY EDUCATION/INDUSTRIAL ARTS	15	6	40%	NR	NR	45,471	53,066	NR	NR	55,493	59,892
04	ARCHITECTURE AND RELATED SERVICES	2	2	100%	NR	NR	NR	NR	NR	NR	NR	NR
Total Masters Degrees		**27,670**	**25,461**	**92%**	**15,481**	**61%**	**36,469**	**35,484**	**10,473**	**41%**	**45,909**	**41,429**
Education Special												
13	EDUCATION	1,060	921	87%	827	90%	57,007	56,271	676	73%	62,685	60,218
25	LIBRARY SCIENCE	8	8	100%	NR	NR	50,264	55,074	NR	NR	56,844	56,573
42	PSYCHOLOGY	40	36	90%	31	86%	50,314	50,459	25	69%	57,096	53,724
Total Education Special		**1,108**	**965**	**87%**	**858**	**89%**	**56,705**	**55,972**	**708**	**73%**	**62,430**	**59,834**

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earn-ings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
Doctorate or Professional Degrees												
51	HEALTH PROFESSIONS AND RELATED CLINICAL SCIENCES	2,674	2,635	99%	1,283	49%	58,402	45,787	883	34%	72,218	56,960
22	LEGAL PROFESSIONS AND STUDIES	1,458	1,435	98%	937	65%	32,091	27,670	444	31%	48,529	40,325
13	EDUCATION	550	532	97%	371	70%	59,180	58,927	286	54%	69,317	66,560
14	ENGINEERING	354	353	100%	113	32%	37,949	33,893	63	18%	52,671	51,228
26	BIOLOGICAL AND BIOMEDICAL SCIENCES	199	196	98%	72	37%	24,988	28,351	43	22%	35,287	34,168
40	PHYSICAL SCIENCES	198	197	99%	60	30%	31,199	25,150	29	15%	48,160	38,259
30	MULTI/INTERDISCIPLINARY STUDIES	166	160	96%	62	39%	40,285	35,474	42	26%	54,021	46,144
45	SOCIAL SCIENCES	142	137	96%	35	26%	36,861	36,741	23	17%	51,206	52,014
42	PSYCHOLOGY	127	125	98%	38	30%	38,224	27,433	22	18%	56,122	45,063
50	VISUAL AND PERFORMING ARTS	100	96	96%	38	40%	19,720	10,671	12	13%	45,315	41,973
01	AGRICULTURE, AGRICULTURE OPERATIONS, AND RELATED SCIENCES	79	78	99%	28	36%	38,788	35,728	18	23%	47,356	40,698
09	COMMUNICATION, JOURNALISM, AND RELATED PROGRAMS	75	74	99%	16	22%	27,025	33,110	8	11%	44,046	41,713
27	MATHEMATICS AND STATISTICS	75	75	100%	18	24%	33,195	31,405	8	11%	50,252	48,656
23	ENGLISH LANGUAGE AND LITERATURE/LETTERS	52	51	98%	21	41%	23,480	20,380	10	20%	36,630	35,735
52	BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES	41	41	100%	8	20%	61,874	46,551	4	10%	99,981	68,959

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earn-ings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
11	COMPUTER AND INFORMATION SCIENCES AND SUPPORT SERVICES	38	37	97%	14	38%	46,748	45,421	10	27%	57,631	58,842
19	FAMILY AND CONSUMER SCIENCES/HUMAN SCIENCES	32	31	97%	7	23%	31,660	27,802	2	6%	66,044	66,044
03	NATURAL RESOURCES AND CONSERVATION	26	26	100%	8	31%	26,102	25,066	4	15%	43,070	42,339
38	PHILOSOPHY AND RELIGIOUS STUDIES	22	22	100%	9	41%	26,510	23,847	5	23%	41,232	44,229
44	PUBLIC ADMINISTRATION AND SOCIAL SERVICE PROFESSIONS	21	19	90%	14	74%	42,927	51,786	9	47%	51,117	52,171
54	HISTORY (NEW) Instructional programs that focus on the study and interpretation of past events, institutions, issues, and cultures	14	14	100%	6	43%	27,838	24,765	4	29%	36,474	35,496
16	FOREIGN LANGUAGES, LITERATURES, AND LINGUISTICS	13	13	100%	NR	NR	21,895	23,997	NR	NR	27,979	25,388
15	ENGINEERING TECHNOLOGIES/TECHNICIANS	5	5	100%	NR	NR	66,431	62,270	NR	NR	68,560	64,496
31	PARKS, RECREATION, LEISURE, AND FITNESS STUDIES	1	1	100%	NR	NR	NR	NR	NR	NR	NR	NR
Total Doctorate or Professional Degrees		**6,462**	**6,353**	**98%**	**3,158**	**50%**	**46,234**	**40,884**	**1,937**	**30%**	**62,480**	**51,228**

Table A2: Public Higher Ed Completions by Degree Level and CIP with Results from Matching to Missouri Wages

CIP	CIP Description	# of Grads 2007 through 2011	# of Grads not Enrolled[a]	% of Grads not Enrolled	# of Grads Found in MO Earnings	% Found in MO Earn-ings	Avg Wage ($$)	Median Wage ($$)	# Meeting Wage Criteria[b]	% Meeting Wage Criteria	Avg Wage ($$)	Median Wage ($$)
Miscellaneous												
13	EDUCATION	93	78	84%	NR	HIGH	28,628	32,487	NR	HIGH	34,641	35,012
45	SOCIAL SCIENCES	21	17	81%	6	35%	24,276	32,957	4	24%	35,866	34,930
Total Miscellaneous		**114**	**95**	**83%**	**NR**	**HIGH**	**28,310**	**32,487**	**NR**	**HIGH**	**34,724**	**35,012**
TOTALS		**169,134**	**147,096**	**87%**	**104,355**	**71%**			**57415**	**39%**		

[a] Not in a public Missouri college or university

[b] In 4 consecutive quarters after graduation with annual earnings between $14000 and $499,999

NR indicates value Not Reportable due to suppression rules of too few observations or too few unknown values

Table A3: Top 3 Industries Employing Missouri College Graduates by STEM Field and Degree Level with ALL Matched Graduates Included

STEM Field and Degree Level	NAICS - Industry Name	# Grads Matched in Wages	Average Wage for NAICS ($$)	Median Wage for NAICS ($$)	Range of Wage for NAICS ($$)	Average Total Wage ($$)	Median Total Wage ($$)	Range of Total Wage ($$)	Median NAICS Wage as % of Median Total Wage
01-ENGINEERING									
Less than BA/BS	33 - Manufacturing	7	20,862	21,641	41,487	24,545	25,691	56,610	84.2%
	44 - Retail Trade	4	NR	NR	NR	NR	NR	NR	
	45 - Retail Trade	4	NR	NR	NR	NR	NR	NR	
	Other Industries	23	16,240	4,007	119,443	16,821	6,162	119,443	65.0%
BA/BS	54 - Professional, Scientific, and Technical Services	558	40,957	44,872	147,600	41,963	45,953	147,600	97.6%
	33 - Manufacturing	389	36,181	37,712	96,521	38,099	40,034	96,521	94.2%
	23 - Construction	197	39,534	45,639	146,494	40,093	45,656	146,494	100.0%
	Other Industries	1,088	26,817	19,452	140,990	28,157	22,903	140,990	84.9%
MASTERS	54 - Professional, Scientific, and Technical Services	140	51,441	52,883	157,772	53,015	54,753	157,772	96.6%
	33 - Manufacturing	45	54,242	54,420	112,613	56,707	55,168	112,613	98.6%
	22 - Utilities	26	66,152	63,796	127,386	67,144	65,163	127,386	97.9%
	Other Industries	237	56,398	61,845	145,854	57,146	63,497	145,854	97.4%
MORE THAN MASTERS	61 - Educational Services	75	29,374	24,000	160,940	29,707	24,000	160,940	100.0%
	33 - Manufacturing	9	53,050	59,005	56,862	61,915	59,065	70,271	99.9%
	54 - Professional, Scientific, and Technical Services	6	38,612	33,692	64,678	41,593	33,692	64,678	100.0%
	Other Industries	23	51,761	46,667	89,425	54,498	55,653	86,653	83.9%
02-COMPUTER									
Less than BA/BS	33 - Manufacturing	227	29,440	26,133	125,274	30,873	27,531	125,274	94.9%
	44 - Retail Trade	174	16,563	12,709	152,726	17,986	15,097	155,490	84.2%
	23 - Construction	160	22,265	18,052	99,095	23,680	19,355	99,095	93.3%
	Other Industries	1,451	22,499	17,186	128,066	24,350	20,248	128,066	84.9%
BA/BS	54 - Professional, Scientific, and Technical Services	416	36,107	36,403	103,399	37,408	37,456	103,399	97.2%
	33 - Manufacturing	178	34,892	35,200	93,956	36,538	37,045	93,896	95.0%

Table A3: Top 3 Industries Employing Missouri College Graduates by STEM Field and Degree Level with ALL Matched Graduates Included									
STEM Field and Degree Level	**NAICS - Industry Name**	**# Grads Matched in Wages**	**Average Wage for NAICS ($$)**	**Median Wage for NAICS ($$)**	**Range of Wage for NAICS ($$)**	**Average Total Wage ($$)**	**Median Total Wage ($$)**	**Range of Total Wage ($$)**	**Median NAICS Wage as % of Median Total Wage**
MASTERS	56 - Administrative and Support and Waste Management and Remediation Services	132	17,293	14,038	92,334	19,457	15,721	92,334	89.3%
	Other Industries	1,319	25,223	22,665	133,152	26,911	25,540	133,152	88.7%
	54 - Professional, Scientific, and Technical Services	103	44,128	48,663	107,968	45,786	50,950	115,050	95.5%
	61 - Educational Services	36	36,549	40,648	117,166	37,986	41,194	130,166	98.7%
	33 - Manufacturing	32	43,922	48,066	84,224	44,856	48,066	84,224	100.0%
	Other Industries	191	45,117	43,950	136,014	46,734	47,360	141,902	92.8%
MORE THAN MASTERS	61 - Educational Services	14	42,297	38,862	81,283	42,697	38,862	81,283	100.0%
	54 - Professional, Scientific, and Technical Services	3	NR	NR	NR	NR	NR	NR	
	Other Industries	1	NR	NR	NR	NR	NR	NR	
03-BIOLOGY/HEALTH									
Less than BA/BS	62 - Health Care and Social Assistance	5,042	29,545	29,622	114,330	31,759	32,573	114,330	90.9%
	54 - Professional, Scientific, and Technical Services	199	18,866	18,948	104,328	19,780	20,167	109,783	94.0%
	61 - Educational Services	194	24,072	23,504	86,573	25,945	25,088	86,573	93.7%
	Other Industries	1,567	24,504	23,420	113,150	27,121	26,711	113,150	87.7%
BA/BS	62 - Health Care and Social Assistance	3,345	32,575	35,550	120,265	34,109	37,534	120,265	94.7%
	61 - Educational Services	776	21,522	20,255	112,091	22,602	21,653	112,091	93.5%
	72 - Accommodation and Food Services	379	6,646	4,513	45,985	7,914	5,464	45,985	82.6%
	Other Industries	2,204	20,038	14,946	148,443	22,007	17,344	166,287	86.2%

Table A3: Top 3 Industries Employing Missouri College Graduates by STEM Field and Degree Level with ALL Matched Graduates Included									
STEM Field and Degree Level	**NAICS - Industry Name**	**# Grads Matched in Wages**	**Average Wage for NAICS ($$)**	**Median Wage for NAICS ($$)**	**Range of Wage for NAICS ($$)**	**Average Total Wage ($$)**	**Median Total Wage ($$)**	**Range of Total Wage ($$)**	**Median NAICS Wage as % of Median Total Wage**
MASTERS	62 - Health Care and Social Assistance	1,157	54,790	50,090	720,836	58,697	55,319	720,836	90.5%
	61 - Educational Services	466	34,410	33,504	242,002	36,435	35,358	242,002	94.8%
	54 - Professional, Scientific, and Technical Services	63	42,132	35,597	179,276	44,386	41,778	179,276	85.2%
	Other Industries	302	33,222	30,029	167,997	36,158	33,827	185,265	88.8%
MORE THAN MASTERS	62 - Health Care and Social Assistance	432	59,581	51,288	187,747	61,746	53,148	187,747	96.5%
	61 - Educational Services	425	35,727	41,588	111,015	36,640	42,193	111,015	98.6%
	54 - Professional, Scientific, and Technical Services	152	46,601	52,317	92,800	47,136	53,030	92,800	98.7%
	Other Industries	346	75,583	65,259	209,320	78,952	79,814	237,693	81.8%
04-PHYSICS									
Less than BA/BS	61 - Educational Services	17	23,424	22,202	48,311	24,827	26,070	48,311	85.2%
	56 - Administrative and Support and Waste Management and Remediation Services	17	13,185	10,266	33,967	17,326	15,787	39,676	65.0%
	22 - Utilities	13	50,437	34,274	84,316	52,179	35,600	84,316	96.3%
	Other Industries	47	16,843	13,649	46,899	19,311	24,792	65,338	55.1%
BA/BS	61 - Educational Services	103	10,216	5,234	78,904	10,878	5,234	78,904	100.0%
	72 - Accommodation and Food Services	65	6,547	5,423	32,957	7,174	6,043	32,957	89.7%
	54 - Professional, Scientific, and Technical Services	62	23,142	24,403	57,533	24,414	26,358	57,533	92.6%
	Other Industries	388	14,484	10,815	88,238	16,369	12,819	88,238	84.4%
MASTERS	61 - Educational Services	27	19,975	15,797	59,442	20,874	17,279	59,442	91.4%

Table A3: Top 3 Industries Employing Missouri College Graduates by STEM Field and Degree Level with ALL Matched Graduates Included

STEM Field and Degree Level	NAICS - Industry Name	# Grads Matched in Wages	Average Wage for NAICS ($$)	Median Wage for NAICS ($$)	Range of Wage for NAICS ($$)	Average Total Wage ($$)	Median Total Wage ($$)	Range of Total Wage ($$)	Median NAICS Wage as % of Median Total Wage
	54 - Professional, Scientific, and Technical Services	24	36,723	37,772	65,370	37,590	40,346	65,217	93.6%
	56 - Administrative and Support and Waste Management and Remediation Services	10	31,690	20,451	126,355	33,788	25,407	126,167	80.5%
	Other Industries	34	26,286	20,806	125,656	27,641	23,107	125,656	90.0%
MORE THAN MASTERS	61 - Educational Services	41	24,938	23,684	70,172	25,575	23,684	70,172	100.0%
	54 - Professional, Scientific, and Technical Services	10	36,800	25,139	77,770	37,440	27,087	77,770	92.8%
	33 - Manufacturing	2	NR	NR	NR	NR	NR	NR	
	Other Industries	7	39,829	49,014	83,108	40,530	49,014	88,018	100.0%
05-MATH									
BA/BS	61 - Educational Services	56	12,388	7,006	43,579	13,843	7,693	46,456	91.1%
	52 - Finance and Insurance	45	19,991	15,105	54,306	21,848	18,041	69,308	83.7%
	72 - Accommodation and Food Services	35	9,930	6,591	61,570	11,366	8,157	61,570	80.8%
	Other Industries	170	17,530	12,707	74,015	19,520	13,867	88,836	91.6%
MASTERS	61 - Educational Services	61	30,012	33,250	76,140	31,345	35,000	76,140	95.0%
	52 - Finance and Insurance	11	35,630	39,608	74,621	35,647	39,608	74,621	100.0%
	92 - Public Administration	7	23,326	27,415	29,617	26,785	28,734	37,105	95.4%
	Other Industries	20	25,218	19,845	86,104	28,457	25,464	86,104	77.9%
MORE THAN MASTERS	61 - Educational Services	14	22,366	13,925	81,258	24,259	13,925	81,258	100.0%
	92 - Public Administration	1	NR	NR	NR	NR	NR	NR	
	62 - Health Care and Social Assistance	1	NR	NR	NR	NR	NR	NR	
	Other Industries	2	NR	NR	NR	NR	NR	NR	

Table A3: Top 3 Industries Employing Missouri College Graduates by STEM Field and Degree Level with ALL Matched Graduates Included

STEM Field and Degree Level	NAICS - Industry Name	# Grads Matched in Wages	Average Wage for NAICS ($$)	Median Wage for NAICS ($$)	Range of Wage for NAICS ($$)	Average Total Wage ($$)	Median Total Wage ($$)	Range of Total Wage ($$)	Median NAICS Wage as % of Median Total Wage
09-NOTSTEM									
Less than BA/BS	72 - Accommodation and Food Services	2,721	8,888	7,222	73,850	10,275	8,874	73,850	81.4%
	62 - Health Care and Social Assistance	2,357	13,805	11,762	95,030	15,034	13,318	95,030	88.3%
	44 - Retail Trade	2,206	11,984	9,660	130,921	13,070	11,209	130,921	86.2%
	Other Industries	13,058	16,622	12,752	189,274	18,062	14,753	189,274	86.4%
BA/BS	61 - Educational Services	8,092	18,109	16,112	104,045	19,466	18,422	104,045	87.5%
	72 - Accommodation and Food Services	4,756	10,162	8,144	105,217	11,838	10,100	105,217	80.6%
	62 - Health Care and Social Assistance	3,863	14,662	13,410	131,251	16,628	16,015	131,251	83.7%
	Other Industries	26,764	17,186	14,522	356,562	19,117	17,374	356,562	83.6%
MASTERS	61 - Educational Services	6,174	33,139	35,663	253,075	33,880	36,245	253,075	98.4%
	54 - Professional, Scientific, and Technical Services	1,395	39,701	39,692	551,077	41,275	41,322	551,077	96.1%
	62 - Health Care and Social Assistance	1,246	25,616	24,332	211,560	27,814	27,089	244,875	89.8%
	Other Industries	3,934	30,396	25,491	897,763	32,492	28,214	897,763	90.3%
MORE THAN MASTERS	61 - Educational Services	1,429	52,820	52,601	922,462	53,529	53,466	922,462	98.4%
	54 - Professional, Scientific, and Technical Services	512	39,064	33,476	104,347	39,751	34,067	121,155	98.3%
	92 - Public Administration	251	25,465	25,060	114,153	26,380	26,367	114,684	95.0%
	Other Industries	280	26,090	18,339	122,561	27,835	21,152	122,561	86.7%
		104,645							

Table A3: Top 3 Industries Employing Missouri College Graduates by STEM Field and Degree Level with ALL Matched Graduates Included

STEM Field and Degree Level	NAICS - Industry Name	# Grads Matched in Wages	Average Wage for NAICS ($$)	Median Wage for NAICS ($$)	Range of Wage for NAICS ($$)	Average Total Wage ($$)	Median Total Wage ($$)	Range of Total Wage ($$)	Median NAICS Wage as % of Median Total Wage

Note: Naics 33 includes Primary Metal Manufacturing, Fabricated Metal Product Manufacturing, Machinery Manufacturing, Computer and Electronic Product Manufacturing, Electrical Equipment, Appliance, and Component Manufacturing, Transportation Equipment Manufacturing, Furniture and Related Product Manufacturing and Miscellaneous Manufacturing

Note: Naics 44 includes retailers in Motor Vehicle and Parts Dealers, Furniture and Home Furnishings Stores, Electronics and Appliance Stores, Building Material and Garden Equipment and Supplies Dealers, Food and Beverage Stores, Health and Personal Care Stores, Gasoline Stations, Clothing and Clothing Accessories Stores,
Naics 45 includes retailers in Sporting Goods, Hobby, Book, and Music Stores, General Merchandise Stores, Miscellaneous Store Retailers and Nonstore Retailers

Table A4: Breakout of employment outcomes for Biological Sciences and Health Care related majors in the Biological / Health Sciences STEM cluster

Year and Degree Level	# Bio-science not enrolled	% Bio-science not enrolled	# Health Care not enrolled	% Health Care not enrolled	# Total not enrolled	# Bio-science found in wages	% Bio-science found in wages	# Health care found in wages	% Health care found in wages	# Total found in wages	# Bio-science meet wage criteria	% Bio-science meet wage criteria	# Health Care meet wage criteria	% Health Care meet wage criteria	# Total meet wage criteria
2007															
1-Cert	-	0.0%	292	100.0%	292	-	0.0%	238	100.0%	238	-	0.0%	107	100.0%	107
2-Assoc	-	0.0%	1203	100.0%	1,203	-	0.0%	1,041	100.0%	1,041	-	0.0%	812	100.0%	812
3-Bach	543	37.0%	923	63.0%	1,466	370	33.9%	722	66.1%	1,092	176	25.6%	512	74.4%	688
4-Grad Cert	1	5.6%	17	94.4%	18	1	12.5%	7	87.5%	8	-	---	-	---	-
5-Mast	83	18.5%	365	81.5%	448	44	14.3%	264	85.7%	308	26	12.2%	187	87.8%	213
7-Doc/Prof	37	7.6%	453	92.4%	490	9	4.2%	206	95.8%	215	5	2.8%	173	97.2%	178
Totals	664	17.0%	3253	83.0%	3,917	424	14.6%	2,478	85.4%	2,902	207	10.4%	1,791	89.6%	1,998
2008															-
1-Cert	-	0.0%	290	100.0%	290	-	0.0%	236	100.0%	236	-	0.0%	164	100.0%	164
2-Assoc	-	0.0%	1,187	100.0%	1,187	-	0.0%	1,019	100.0%	1,019	-	0.0%	867	100.0%	867
3-Bach	570	38.6%	908	61.4%	1,478	416	35.5%	756	64.5%	1,172	168	21.0%	631	79.0%	799
4-Grad Cert	1	4.5%	21	95.5%	22	-	0.0%	9	100.0%	9	-	0.0%	7	100.0%	7
5-Mast	78	14.7%	454	85.3%	532	44	11.5%	337	88.5%	381	33	10.2%	292	89.8%	325
7-Doc/Prof	42	7.9%	490	92.1%	532	19	6.8%	259	93.2%	278	9	3.9%	224	96.1%	233
Totals	691	17.1%	3,350	82.9%	4,041	479	15.5%	2,616	84.5%	3,095	210	8.8%	2,185	91.2%	2,395
2009															-
1-Cert	-	0.0%	287	100.0%	287	-	0.0%	250	100.0%	250	-	0.0%	171	100.0%	171
2-Assoc	3	0.2%	1,309	99.8%	1,312	2	0.2%	1,211	99.8%	1,213	-	0.0%	1,019	100.0%	1,019
3-Bach	640	38.3%	1,029	61.7%	1,669	422	33.2%	848	66.8%	1,270	189	21.7%	680	78.3%	869
4-Grad Cert	1	6.3%	15	93.8%	16	-	0.0%	6	100.0%	6	-	0.0%	5	100.0%	5
5-Mast	94	16.1%	489	83.9%	583	59	14.9%	337	85.1%	396	42	12.7%	288	87.3%	330
7-Doc/Prof	51	9.4%	489	90.6%	540	14	5.7%	231	94.3%	245	11	5.2%	202	94.8%	213
Totals	789	17.9%	3,618	82.1%	4,407	497	14.7%	2,883	85.3%	3,380	242	9.3%	2,365	90.7%	2,607
2010															-
1-Cert	-	0.0%	340	100.0%	340	-	0.0%	292	100.0%	292	-	0.0%	199	100.0%	199
2-Assoc	3	0.2%	1,353	99.8%	1,356	2	0.2%	1,240	99.8%	1,242	-	0.0%	1,030	100.0%	1,030
3-Bach	778	40.5%	1,142	59.5%	1,920	516	35.1%	953	64.9%	1,469	212	22.3%	737	77.7%	949
4-Grad Cert	-	0.0%	26	100.0%	26	-	0.0%	11	100.0%	11	-	0.0%	5	100.0%	5
5-Mast	108	17.4%	512	82.6%	620	58	14.7%	336	85.3%	394	41	12.6%	285	87.4%	326
7-Doc/Prof	40	6.5%	580	93.5%	620	19	6.1%	290	93.9%	309	14	5.1%	261	94.9%	275
Totals	929	19.0%	3,953	81.0%	4,882	595	16.0%	3,122	84.0%	3,717	267	9.6%	2,517	90.4%	2,784
2011															-
1-Cert	-	0.0%	341	100.0%	341	-	0.0%	306	100.0%	306	-	0.0%	140	100.0%	140
2-Assoc	-	0.0%	1,298	100.0%	1,298	-	0.0%	1,165	100.0%	1,165	-	0.0%	285	100.0%	285
3-Bach	957	39.7%	1,453	60.3%	2,410	575	33.8%	1,126	66.2%	1,701	77	18.9%	331	81.1%	408
4-Grad Cert	-	0.0%	45	100.0%	45	-	0.0%	29	100.0%	29	-	0.0%	7	100.0%	7
5-Mast	100	15.2%	558	84.8%	658	58	13.0%	388	87.0%	446	17	8.7%	179	91.3%	196
7-Doc/Prof	26	4.0%	623	96.0%	649	11	3.6%	297	96.4%	308	4	15.4%	22	84.6%	26
Totals	1,083	20.1%	4,318	79.9%	5,401	644	16.3%	3,311	83.7%	3,955	98	9.2%	964	90.8%	1,062
GRAND TOTALS	4,156	18.4%	18,492	81.6%	22,648	2,639	15.5%	14,410	84.5%	17,049	1,024	9.4%	9,822	90.6%	10,846

Appendix B: Means Table and Regression Results

Table B.1 Means for Variables in Regression Analyses

	N	MEAN	STD
Less than Assoc and NonStem	51,800	0.02	0.140
Less than Assoc and Stem	51,800	0.02	0.140
Assoc and NonStem	51,800	0.139	0.346
Assoc and Stem	51,800	0.094	0.292
Bachelor and open selective and Nonstem	51,800	0.031	0.173
Bachelor and open selective and stem	51,800	0.011	0.106
Bachelor and medium selective and Nonstem	51,800	0.111	0.314
Bachelor and medium selective and stem	51,800	0.027	0.161
Bachelor and highly selective and Nonstem	51,800	0.242	0.428
Bachelor and highly selective and stem	51,800	0.08	0.272
Master and Highly Selective and NonStem	51,800	0.121	0.326
Master and Highly Selective and Stem	51,800	0.031	0.172
Master and NonSelective and NonStem	51,800	0.042	0.201
Master and NonSelective and Stem	51,800	0.006	0.078
Professional and Nonstem	51,800	0.004	0.060
Professional and stem	51,800	0.01	0.101
Doctor and Nonstem	51,800	0.007	0.085
Doctor and stem	51,800	0.005	0.068
Total wages	51,800	35,361	18,877
Cumulative GPA	51,800	3.287	0.499
cumcredr_index	51,800	1.282	0.466
Female	51,792	0.618	0.486
Male	51,792	0.382	0.486
Black	51,800	0.064	0.244
Hispanic	51,800	0.014	0.116
White	51,800	0.815	0.389
Asian and Pacific islander	51,800	0.014	0.117
Multi-Race	51,800	0.004	0.061
Other race	51,800	0.078	0.269
Age	51,800	28.079	8.225
year_2007	51,800	0.193	0.395
year_2008	51,800	0.197	0.398
year_2009	51,800	0.239	0.427
year_2010	51,800	0.253	0.435
year_2011	51,800	0.117	0.322

Table B.2 Regression Results

Variable	Parameter Estimate	Standard Error	t Value	Stat Sig
Intercept	7,739	3,143	2.460	**
Less than Assoc and NonStem	0			
Less than Assoc and Stem	5,824	4,319	1.350	
Assoc and NonStem	1,918	3,314	0.580	
Assoc and stem	22,488	3,512	6.400	***
Bachelor and Open enrollment and NonStem	-1,459	4,043	-0.360	
Bachelor and Open enrollment and Stem	10,390	6,092	1.710	*
Bachelor and Moderately Selective and NonStem	1,298	3,420	0.380	
Bachelor and Moderately Selective and Stem	-1,564	4,484	-0.350	
Bachelor and Highly Selective and NonStem	5,616	3,240	1.730	*
Bachelor and Highly Selective and Stem	182	3,529	0.050	
Professional and NonStem	-52,214	8,791	-5.940	***
Professional and Stem	-9,238	7,256	-1.270	
Doctor and NonStem	-53,963	20,712	-2.610	***
Doctor and Stem	-73,650	18,886	-3.900	***
Master and Highly Selective and NonStem	25,343	4,199	6.040	***
Master and Highly Selective and Stem	45,291	6,625	6.840	***
Master and NonSelective and NonStem	-9,936	6,200	-1.600	
Master and NonSelective and Stem	25,911	16,235	1.600	
cumgpa*Less than Assoc and NonStem	0			
cumgpa*Less than Assoc and Stem	-466	1,316	-0.350	
cumgpa*Assoc and NonStem	-500	986	-0.510	
cumgpa*Assoc and stem	-3,888	1,048	-3.710	***
cumgpa*Bachelor and Open enrollment and NonStem	939	1,227	0.770	
cumgpa*Bachelor and Open enrollment and Stem	1,397	1,868	0.750	
cumgpa*Bachelor and Moderately Selective and NonStem	120	1,019	0.120	
cumgpa*Bachelor and Moderately Selective and Stem	4,095	1,358	3.020	***
cumgpa*Bachelor and Highly Selective and NonStem	-773	961	-0.800	
cumgpa*Bachelor and Highly Selective and Stem	4,948	1,048	4.720	***
cumgpa*Professional and NonStem	23,902	2,758	8.670	***
cumgpa*Professional and Stem	18,907	2,124	8.900	***
cumgpa*Doctor and NonStem	20,234	5,353	3.780	***
cumgpa*Doctor and Stem	26,719	5,005	5.340	***
cumgpa*Master and Highly Selective and NonStem	-2,806	1,183	-2.370	**
cumgpa*Master and Highly Selective and Stem	-3,228	1,807	-1.790	*
cumgpa*Master and NonSelective and NonStem	5,686	1,671	3.400	***
cumgpa*Master and NonSelective and Stem	-1,133	4,284	-0.260	
CUMGPA	2,316	917	2.530	**
cumcredr_index	-432	160	-2.690	***

Variable	Parameter Estimate	Standard Error	t Value	Stat Sig
female	-4,596	141	-32.640	***
male[a]	0	---	---	
Hispanic	-1,262	615	-2.050	**
White	-102	258	-0.390	
Asian and Pacific islander	-482	617	-0.780	
Multi-Race	-851	1,112	-0.770	
Other race	-541	346	-1.560	
Black[b]	0	---	---	
age	560	9	62.970	***
Year_2007[c]	0	---	---	
year_2008	417	212	1.970	**
year_2009	-484	203	-2.380	**
year_2010	-1,156	200	-5.770	***
year_2011	-987	248	-3.980	***

Note: *, **, *** denotes statistically significant at the 10%, 5% and 1% level.

[a] reference group for females

[b] reference group for all other races

[c] reference year for year effects

Appendix C: Data Preparation and Merging Procedures

Completion and Term data sets

We received a data set containing Missouri public higher education completion records from academic years 2006-07 through 2011-12 and term registration records from 2005-06 through 2011-12. We processed those data to identify the last degree or certificate earned by each individual, flag individuals who were still enrolled in Missouri's public higher education system after receiving their last credential, and for those not subsequently enrolled, find the total credit hours and grade point averages associated with their last degree.

Step 1: We identified two IDs in the completions data set that occurred so frequently that they were likely associated with more than a single person. Completion records with either of these two specific values in the ID field were deleted from the completions data set. A total of 31 completion records for these two IDs were removed. This changed the total number of completion records in the data set from 192,149 to 192,118.

Step 2: We categorized completions by educational attainment level and STEM focus areas. All completions were assigned a degree type variable reflecting level (e.g., from unknown type, to certificates, to associate degrees, …, to professional and doctoral degrees). The CIP code associated with each completion was examined to determine if it reflected one of the following STEM fields: Engineering, Computer Science, Biological / Health Sciences, Physical Sciences, or Mathematics.

Step 3: We identified and kept the last completion record for each person in the completions data set. If more than one credential was earned at the same time, preference was given to the degree or certificate reflecting the highest level of educational attainment. If there were still multiples, completions in STEM fields were given preference and when STEM field was not relevant, the completion record with the lowest CIP code value was kept. This filtering / unduplication process left a total of 169,248 completion records in the completions data set. This represents the number of persons who completed a degree or certificate program in a public college or university between 2007 and 2011.

Step 4: We examined the term registration records and deleted the observations with the same invalid IDs identified in Step 1. This step removed more than 4,400 term records with those 2 ID values which provided further confidence that the ID values were likely used as a generic student identifier when the real student identifier was not known.

Step 5: We merged the unduplicated completion records and term records by person ID for two purposes. First, we wanted to identify individuals who continued their enrollment in a public college AFTER their last degree or certificate was earned. All completion records that were matched with one or more term records for terms that occurred AFTER the last completion was earned were flagged and removed from the completions data file. This resulted in a reduction in the number of individuals with completions from 169,248 to 147,191 which represents graduates not enrolled in a Missouri public college or university after their last graduation.

The second purpose of linking completion and term records was to add cumulative GPA and total credit hour data from the term records. Most matches made for this purpose were for the same person in the

same institution in the same term for the same degree. In a few cases, term records from a term prior to the graduation term were kept.[9]

Merging Completions with Wage Data and Steps to Summarize Wage Data

This process linked unemployment wage earnings data to completion records. The purpose was to determine total first year earnings for each graduate who was not observed re-enrolled in public higher education and to determine which employing industry contributed the most to his or her total earnings.

Step 1: For each completion in the final data file of graduates who were no longer enrolled at a public higher education institution in Missouri, we identified and saved the four calendar year quarters to be examined for determining first year earnings. For example, a completion that occurred in a fall term would have the four quarters in the following calendar year assigned. Spring graduates would have the 3rd and 4th quarters from the same calendar year and the 1st and 2nd quarters of the following calendar year identified.

Step 2: We merged wage records with the completion records by person ID, keeping only those wage records that were in the quarters identified in Step 1.

Step 3: In this step, we summarized and unduplicated the wage data retrieved for each graduate. Wages for each person were summed across quarters by industry code. This process provided a count of the number of quarters each graduate appeared in the wage data in the year following graduation, the total number of wage records observed, and total earnings in the first year. In addition, the industry code accounting for the largest share of total earnings was designated as that graduate's "primary industry" and the total wages earned in that industry also were saved. All summarized wage variables were saved to the "master" completion records. A total of 104,645 graduates were matched at least once in the wage data in the year after graduation.

Assigning Institutional Selectivity to Completion Records

Using information from the DHE, we assigned a selectivity level to each completion record based on the institution from which it was earned. The institution types and/or specific institutions included in each selectivity level are shown below.

Highly Selective	University of Missouri campuses; Truman State University
Moderately Selective	Most regional 4 year colleges and universities, including Missouri State University, Missouri Southern State University, Northwest Missouri State University, Southeast Missouri State University, and University of Central Missouri
Open Enrollment	All community colleges and Harris-Stowe University, Lincoln University, and Missouri Western State University

Cumulative credit hour index

We created a credit hour index variable for use in regression analyses to reflect the relative number of credit hours earned for each completed certificate or degree. We divided the cumulative credit hours completed from term records linked to completion records by a fixed credit hour value. The credit hour denominators used for each degree level were: 30 for certificates; 60 for associate's degrees; 120 for bachelor's degrees; 32 for master's degrees; 80 for doctoral degrees; and 100 for professional degrees.

[9] A total of 1,328 completion records had no appropriate term records available for matching.