Industry Concentration and Workforce Pathways in South Carolina

Findings from Postsecondary Employment Outcomes (PSEO) Data

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The Longitudinal Employer-Household Dynamics (LEHD) Program, a part of the US Census Bureau's Center for Economic Studies, provides public information on employers and employees. As part of that program, the Postsecondary Employment Outcomes (PSEO) data provide earnings and employment outcomes for college graduates by degree level, major, and institution. As of May 2025, the PSEO Coalition included more than 35 states and 1,000 institutions nationwide.

The PSEO Coalition collaborates with LEHD at the US Census to link postsecondary education data with national unemployment insurance wage data and supports its members and the larger postsecondary community in using these data for decision making.

Executive summary

This analysis uses South Carolina's Postsecondary Employment Outcomes (PSEO) data to examine how graduates from different fields of study are distributed across industries. The guiding question is: Which academic programs lead to clear labor market placement, and which lead to more diffuse or uncertain employment outcomes?

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Key findings

- **Program/Industry Alignment:** Some programs are tightly linked to a single industry. For example, most education graduates work in educational services, most health professions graduates in health care, and most precision production graduates in manufacturing.
- **Program/Industry Dispersion:** Many programs, especially at the bachelor's level, lead to employment spread across multiple industries. In programs such as interdisciplinary studies, agriculture, philosophy, and natural resources, no single industry employs more than one-fifth of graduates.
- **Shifts Over Time:** For some programs, such as education, graduates continue to work primarily in the same industry over time, while in others employment outcomes become more dispersed across industries. Culinary associate degree graduates, for instance, are highly concentrated in Accommodation and Food Services in year one, but far more dispersed by year 10. By contrast, psychology and biological sciences graduates at the bachelor's level are more likely to work in a more concentrated set of industries several years after graduation.
- **Degree-Level Differences:** Associate programs are often more tightly aligned to specific industries than bachelor's programs.

For example, associate degrees in health professions connect graduates even more directly to the health care industry than their bachelor's counterparts.

Implications

These findings illustrate how different academic programs connect graduates to the workforce in South Carolina. Concentrated pathways, where a large share of graduates from a program work in the same industry, may indicate strong pipelines into specific industries, while diffuse pathways, where graduates are spread across many industries, may provide greater options for employment after graduation but less upfront clarity about likely employment outcomes for students. Understanding these differences can inform workforce preparedness, student advising, and partnerships between higher education and employers. While it is critical to align programs with workforce needs, it is also important to recognize the value of programs that prepare graduates for a wider spectrum of employment opportunities. Over the long run, these more flexible programs may provide broader value to students and the state economy.

Introduction

This brief uses South Carolina's Postsecondary Employment Outcomes (PSEO) data to examine how graduates from different academic programs are distributed across industries. The guiding question is: *Which programs lead to clear labor market placement, and which lead to more diffuse employment outcomes across industries?*

By focusing on program-to-industry concentration, the analysis highlights how higher education connects to the workforce and how resilient those pathways are over time. Programs such as in education or health that channel most graduates into a single industry show what we term strong alignment. Conversely, programs like interdisciplinary studies or philosophy, lead to a wider spread of employment outcomes, or diffuse outcomes. Concentrated pathways may signal strong pipelines to employment but carry risks if industries contract, while diffuse pathways

may offer flexibility but less clarity for students.

Methodology and limitations

This analysis measures how closely graduates from different academic programs in South Carolina are clustered within specific industries. To do so, we created an Industry Concentration Index for each program in the PSEO dataset, based on the Herfindahl–Hirschman Index (HHI). The HHI is a standard measure of how evenly outcomes are distributed. In this context, a value closer to one indicates that most graduates from a program are employed in very few industries, while values closer to 0 suggest that graduates are spread across many sectors.

To make the measure more intuitive, we also report the share of graduates employed in the single largest industry for each program. Taken together, the index and the top industry share provide complementary perspectives: the index shows overall concentration, while the top industry share highlights the prominence of a specific pathway.

Although many dashboards already show where graduates are employed, few analyses systematically measure the concentration or dispersion of those outcomes across programs. Applying an HHI approach offers a new lens on the structure of education-to-work pathways. It highlights which programs lead to clearly defined career routes and which produce graduates with broader, less predictable outcomes: this understanding can inform state workforce strategy, institutional program design, and student advising.

Programs are defined at the two-digit CIP code level, and industries at the NAICS sector level. Two-digit CIP codes reflect broad academic disciplines, not specific majors. For example, a single two-digit category like "Health Professions" may encompass many distinct degree programs and career

pathways. While this level of aggregation enables statewide analysis, it may obscure variation in outcomes among individual majors or institutional offerings. Readers should interpret program-to-industry results as indicative of general patterns, not specific curricula or job titles. The analysis focuses on graduates with bachelor's degrees across 31 programs and associate degrees across 24 programs with available outcomes. Results are reported at one, five, and 10 years after graduation.

This analysis focuses on statewide outcomes and pools data across institutions. It does not account for institutional differences or for programs below the associate or bachelor's level. It also does not control whether or the extent to which graduates from a program subsequently earn additional degrees. As with all PSEO analyses, results are subject to Census Bureau disclosure standards, which may limit detail in some cases. The tables and analysis here represent a subset of the data.

While South Carolina has relatively strong coverage in the PSEO data (about 86 percent of graduates are captured), the results do not represent all graduates statewide and should be interpreted as indicative rather than fully comprehensive.

Key questions and findings

What are the most concentrated programs (by industry employment)?

The majority of bachelor's degree programs are not heavily concentrated in a single industry. Still, understanding the relative concentration and the way top industries shift over time is useful. The top three programs listed here, education, health professions, and architecture, all show relatively high industry concentration. In economic policy, HHI is commonly used to estimate the concentration of firms within a given industry. In that context, an industry with a concentration value below 0.15 is considered unconcentrated, a value above 0.25 is considered highly concentrated, and values in between are considered moderately concentrated. Although these thresholds were developed for a different setting, they provide a

useful reference for interpreting relative levels of concentration across programs in this analysis.

The programs shown in Table 1 represent the most highly concentrated bachelor's programs in the state, with the top three even exceeding 0.5 in year one. Each of the top three programs has more than 70 percent of graduates employed in a single industry, which signals strong program to industry alignment. Overall, eight of the state's 31 bachelor's degree programs (defined based on two-digit CIP) have concentration indexes of at least 0.15 and top industry shares of at least 30 percent, which reflects the general tendency toward more dispersion among bachelor's programs. In Table 1, we display the top five programs in terms of industry concentration.

Table 1: Top five most concentrated bachelor's degree programs (Year one outcomes)

Program	Industry Concentration - Year 1	Top Industry - Year 1	Top Industry Share - Year 1
Education	0.64	Educational Services	80%
Health Professions and Related Programs	0.58	Health Care and Social Assistance	76%
Architecture and Related Services	0.50	Professional, Scientific, and Technical Services	70%
Public Administration and Social Service	0.23	Health Care and Social Assistance	40%
Engineering-Related Technologies/Technicians	0.21	Manufacturing	42%

Overall, 14 of the 24 associate programs have concentration indexes of at least 0.15 and top industry shares of at least 30 percent, which indicates a higher degree of alignment at the associate degree level than the bachelor's degree level. The top five most concentrated associate programs, displayed in Table 2, all have indexes greater than 0.3. Associate degrees in health professions lead the way, with 90 percent of employed graduates working in health care and social assistance. Precision production shows a similar pattern, with 67 percent of employed graduates working in manufacturing in year one. These outcomes reflect clear program to industry connections in South Carolina.

Differences in concentration across degree levels may be reflecting differences in institutional capacity or the workforce context graduates enter. Larger bachelor's degree granting institutions often have broader employer networks and placement processes, while associate degree institutions may have more targeted relationships with specific industries. Institutions that predominantly award two-year degrees may be in areas (or attract students from areas) that have fewer industries. These differences in institutional reach and context may explain some of the variation in concentration between degree levels.

Table 2: Top five most concentrated associate degree programs (Year one outcomes)

Program	Industry Concentration - Year 1	Top Industry - Year 1	Top Industry Share - Year 1
Health Professions and Related Programs	0.82	Health Care and Social Assistance	90%
Precision Production	0.46	Manufacturing	67%
Legal Professions and Studies	0.32	Professional, Scientific, and Technical Services	54%
Culinary, Entertainment, and Personal Services	0.31	Accommodation and Food Services	52%
Social Sciences	0.30	Professional, Scientific, and Technical Services	50%

What are the least concentrated programs?

Graduates from bachelor's degree programs tend to show more dispersion than those from associate programs. Fifteen of the 31 bachelor's programs have concentration indexes below 0.1 and top industry shares of 20 percent or less. Interdisciplinary studies leads the group, which reflects the internal diversity of this two-digit CIP category, grouping together multiple subfields with distinct labor market connections. Other programs with relatively high dispersion include agriculture and animal sciences, philosophy and religious studies, and natural resources. Among these 15 programs, most fall within a narrow band, with concentration values between 0.07 and 0.1; Table 3 highlights five illustrative examples at the lowest end of this range.

Table 3: Top five least concentrated bachelor's programs (Year one outcomes)

Program	Industry Concentration - Year 1	Top Industry - Year 1	Top Industry Share - Year 1
Multi/Interdisciplinary Studies*	0.07	Professional, Scientific, and Technical Services	12%
Agricultural/Animal/Plant/Veterinary Science	0.07	Professional, Scientific, and Technical Services	14%
Philosophy and Religious Studies	0.08	Accommodation and Food Services	12%
Area, Ethnic, Cultural, Gender, and Group Studies	0.08	Educational Services	13%
Natural Resources and Conservation	0.08	Public Administration	16%

*Note: This program includes diverse subfields such as Historic Preservation, Neuroscience, and Mathematics and Computer Science. Results reflect aggregate outcomes across this category and may not represent any single major within it.

Only five of the state's 24 associate programs have concentration indexes at or below 0.1, compared to 16 bachelor's programs. The most dispersed associate program is business, management, and marketing, where just 14 percent of employed graduates are working in retail trade in their first year after graduation. Without more granular data, it is difficult to distinguish whether this dispersion reflects the broad range of employment options associated with associate-level business degrees, weaker alignment with specific labor market pathways, or a combination of both.

Table 4: Top five least concentrated associate programs (Year one outcomes)

Program	Industry Concentration - Year 1	Top Industry - Year 1	Top Industry Share - Year 1
Business, Management, Marketing	0.09	Retail Trade	14%
Computer and Information Sciences and Support Services	0.09	Manufacturing	13%
Education	0.10	Educational Services	15%
Biological and Biomedical Sciences	0.10	Health Care and Social Assistance	20%
Foreign Languages, Literatures, and Linguistics	0.10	Educational Services	18%

Shifts in industry concentration and employment over time

Tables 5 and 6 examine different ways that program-to-industry relationships change over time between year one and year 10 after graduation. Table 5 focuses on changes in the overall degree of industry concentration within programs, while Table 6 highlights cases where the specific industry employing the largest share of graduates shifts over time.

These changes are less likely in tightly aligned programs such as education, but more likely in diffuse fields like social sciences, where early-career jobs may differ substantially from longer-term outcomes. Tracking change over time helps distinguish degrees that lead to long-term employment in the same industry from those where employment is more likely to shift across industries.

For associate degrees, culinary programs show strong industry concentration in year one but much weaker alignment by year 10. This pattern may indicate that graduates are leaving the field, moving into other industries, or pursuing additional education. We see similar trends for associate programs in legal professions, social sciences, and agriculture. For bachelor's programs, the patterns are somewhat different. Because these programs begin at lower levels of concentration, the shifts over time are not as pronounced. One exception is architecture, which declines from a concentration of 0.25 to 0.12, suggesting graduates in architecture are more likely than other programs to switch industries

between year one and year 10 after graduation. At the same time, graduates in psychology and biological sciences show increases in concentration over the first decade which may indicate a less direct initial path into the related industry compared to other fields.

Table 5: Programs with the largest change in concentration from Year one to Year 10

Degree	Program	Industry Concentration - Year 1	Industry Concentration - Year 10	Change – (Year 1 to 10)
Associate	Culinary, Entertainment, and Personal Services	0.31	0.13	-0.18
Associate	Legal Professions and Studies	0.32	0.16	-0.16
Associate	Social Sciences	0.30	0.17	-0.13
Associate	Agricultural/Animal/Plant/Veterinary Science and Related Fields	0.25	0.12	-0.13
Baccalaureate	Architecture and Related Services	0.50	0.39	-0.11
Baccalaureate	Psychology	0.12	0.16	0.04
Baccalaureate	Biological and Biomedical Sciences	0.13	0.21	0.09

Beyond changes in overall industry concentration, Table 6 highlights shifts over time in the specific industry employing the largest share of graduates. Graduates with bachelor's degrees in education see extremely high industry shares and consistent alignment in the education services industry. Compare that outcome to associate degree earners in education, who see more diffuse outcomes. Although the top industry for associate graduates is educational services in year one, the share is only 15 percent. By year 10, associate degree graduates in an educational field see a high industry share of 17 percent in retail trade. This signals a lack of clear long-term alignment, at least to the education industry, for associate degree earners in this program.

For communications technologies associate programs, the top industry of employment shifts from information in the first year to retail trade by year 10. Among bachelor's graduates in engineering and the social sciences, initial employment is concentrated in seemingly related industries (manufacturing and public administration). By year 10, however, the top

industry for both fields becomes professional, scientific, and technical services, suggesting that graduates transition into more professional services roles as their careers progress.

Visual and performing arts graduates, at both the associate and bachelor's level, are most often employed in retail trade during their first year. By year 10, they appear to move into somewhat more related fields, with manufacturing and educational services emerging as top industries. Associate visual arts programs, such as graphic design, may channel some graduates into manufacturing roles, which may align more closely with their technical design training than retail trade. It is worth noting, however, that top industry shares remain relatively modest in these cases (for instance, only 15 percent of visual and performing arts associate graduates are employed in manufacturing), signaling that employment outcomes remain widely dispersed across industries.

Like education, graduates from business, management, marketing, and related fields show differences in how their top industries of employment change over time. Associate graduates in these fields are most likely to be employed in retail trade initially, but by year 10 their top industry shifts to health care and social assistance. The top industry for graduates with a bachelor's degree in business, management, marketing and related fields are finance and insurance in both years one and year 10.

Table 6: Programs with shifts in top employing industry between Year one and Year 10

Degree	Program	Top Industry - Year 1	Top Industry Share - Year 1	Top Industry - Year 10	Top Industry Share - Year 10
Associate	Education	Educational Services	0.15	Retail Trade	0.17
Baccalaureate	Education	Educational Services	0.80	Educational Services	0.74
Associate	Communications Technologies	Information	0.26	Retail Trade	0.20
Baccalaureate	Engineering	Manufacturing	0.32	Professional, Scientific, and Technical Services	0.28

Degree	Program	Top Industry - Year 1	Top Industry Share - Year 1	Top Industry - Year 10	Top Industry Share - Year 10
Baccalaureate	Social Sciences	Public Administration	0.12	Professional, Scientific, and Technical Services	0.17
Associate	Visual and Performing Arts	Retail Trade	0.22	Manufacturing	0.15
Baccalaureate	Visual and Performing Arts	Retail Trade	0.16	Educational Services	0.22
Associate	Business, Management, Marketing	Retail Trade	0.14	Health Care and Social Assistance	0.14
Baccalaureate	Business, Management, Marketing	Finance and Insurance	0.15	Finance and Insurance	0.15

How do bachelor's and associate programs differ within the same CIP family?

Comparing bachelor's and associate programs within the same field highlights important differences in how graduates connect to the labor market. In some areas, such as health professions, both degree levels show strong alignment to the health care industry (although the associate degree is more concentrated). In other fields the opposite is true. Associate programs in the legal professions, agriculture, and social sciences show much weaker alignment than their bachelor's counterparts. These differences suggest that the credential level shapes not only the type of jobs graduates take, but also the degree to which those jobs are concentrated in a single industry.

Table 7: Differences in concentration between bachelor's and associate programs within the same program

Program	Industry Concentration Index - Year 1 (BA)	Industry Concentration Index - Year 1 (Associate)	Year 1 Difference (BA - Associate)	Top Industry - Year 1 (BA)	Top Industry - Year 1 (Associate)
Education	0.64	0.10	0.55	Educational Services	Educational Services
Agricultural/Animal/Plant/Veterinary Science and Related Fields	0.07	0.25	-0.17	Professional, Scientific, and Technical Services	Professional, Scientific, and Technical Services
Legal Professions and Studies	0.14	0.32	-0.18	Professional, Scientific, and Technical Services	Professional, Scientific, and Technical Services
Social Sciences	0.08	0.30	-0.22	Public Administration	Professional, Scientific, and Technical Services
Health Professions and Related Programs	0.58	0.82	-0.24	Health Care and Social Assistance	Health Care and Social Assistance

Next steps for expanding the analysis

Several extensions could strengthen this work. One option is to compare concentration patterns at the institution level and across sectors, institution types, and geographic contexts, such as community colleges and four-year universities or rural- and urban-serving institutions. These approaches would allow a deeper look at how different aspects of the higher education system contribute to workforce development.

Looking ahead, new variables in PSEO may allow for more granular analysis. On the employment side, adding occupations data—possible as more states, like South Carolina, enhance their wage records with that information—would help assess not just the industries but the specific roles graduates take on. On the education side, additional information about employment at the four-digit CIP level would allow explorations of the relationship between programs and industries within slightly narrower groups of disciplines. At the same time, disclosure rules may limit the extent to which this analysis would be possible, if the number of graduates employed in a specific industry or occupation is too small to report.

South Carolina's higher education landscape is shaped by substantial state investment, in part through scholarships and targeted support for programs viewed as critical for the state economy, such as education, STEM, and accounting. These funding streams, alongside other financial aid programs that reduce student debt burdens, influence both enrollment patterns and the connection between programs and the workforce. Future work could examine how program-level concentration interacts with these policy investments.[1]

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[1] South Carolina has also taken policy steps to support alignment between education and workforce needs. The Statewide Education and Workforce Development Act called for the development of an Educational Program Alignment Toolkit, overseen by the Coordinating Council for Workforce Development. This effort is intended to strengthen the connection between K-12, technical colleges, and higher education, and ensure that curricula and programs match the state's workforce priorities.

Conclusion

This analysis shows that postsecondary programs in South Carolina differ substantially in their connection to the workforce. Some programs— particularly in education, health professions, and precision production— lead to well-defined pathways into specific industries, offering students relatively clear expectations about where they are likely to work after graduation. Other programs, especially at the bachelor's level, produce more diffuse outcomes, with graduates spread across many industries where no single sector employs a large share. These patterns are not inherently positive or negative, but they carry different implications for students, institutions, and the state.

Importantly, program-to-industry alignment is not static. For some fields, concentration remains strong over time, signaling durable pipelines into specific sectors. In others, alignment weakens or shifts as careers progress, suggesting that the industry a graduate enters does not always predict the longer-term industry in which they work. These dynamics underscore the value of examining workforce connections over multiple time horizons rather than relying solely on early-career placement.

Differences between associate and bachelor's degree programs further highlight how credential level shapes labor market outcomes. Associate programs often show stronger and more immediate alignment with specific industries, while bachelor's programs more frequently lead to broader, less concentrated employment patterns that may reflect greater flexibility or longer-term career mobility. Understanding these distinctions can help students choose programs that match their preferences for clarity versus flexibility and help institutions tailor advising and employer engagement accordingly.

> For policymakers, these findings offer a framework for thinking more precisely about their investments in workforce alignment.

For policymakers, these findings offer a framework for thinking more precisely about their investments in workforce alignment. Concentrated programs may be well positioned to meet targeted labor market needs,

while more diffuse programs may contribute to adaptability and resilience in a changing economy. Using PSEO data to assess both the concentration and evolution of education-to-work pathways can support more informed decisions about program investment, workforce partnerships, financial aid and outcomes-based funding policies, and the role of higher education in advancing economic opportunity across the state.

Taken together, this analysis demonstrates how PSEO data can deepen states' understanding of not just where graduates work but how reliably and durably academic programs connect to the labor market. Such insights are essential for strengthening public trust in higher education and ensuring that postsecondary pathways align with both individual aspirations and the long-term needs of their economy.