

MAJOR UNEMPLOYMENT

How Academic Programs of Study Affect
Hoosier Unemployment Patterns

*A Research Brief from the
Indiana Workforce Intelligence System*

August 2012

Research conducted by the
Indiana Business Research Center
Indiana University Kelley School of Business



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Development of the Indiana Workforce Intelligence System and the research based on these data have been supported by a grant from Lumina Foundation. The views expressed in this publication are those of the authors and do not necessarily represent those of Lumina Foundation, their officers or employees.

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EXECUTIVE SUMMARY

Prolonged periods of unemployment often lead to introspection. Whether it is politicians and policymakers reconsidering public policy or individuals questioning career choices, labor market dynamics is the topic of the day. In these difficult economic times, the question can boil down to this: In terms of employability, am I in the right profession? Or, if a student, am I studying the right academic discipline?

This study examines the recent unemployment history of graduates from Indiana's public colleges and universities to help address these questions.

In the aftermath of the Great Recession, graduates from Indiana's public postsecondary institutions had greatly different unemployment experiences based on their programs of study:

- Those that pursued architecture, industrial arts/consumer service and engineering had the highest probabilities of becoming unemployed.
- Those that pursued degrees in health, education and biology/life sciences had the lowest chances of becoming unemployed.

Programs of study also affected the duration of unemployment:

- Health majors, if succumbing to unemployment, had the highest probability of short-term unemployment – four weeks or less.
- Architecture graduates consistently had the greatest chance of prolonged unemployment – more than 26 weeks.

Not all majors suffered the double whammy of higher chances of unemployment and longer duration that architecture graduates did:

- While industrial arts and engineering graduates had the second- and third-highest chances of becoming unemployed, they had a 44 percent chance that their unemployment would be short-term, while architecture graduates had only a 28 percent chance of finding work in four weeks or less.

The level of degree attainment and the industry of employment did not influence the unemployment experience of the average graduate from Hoosier public colleges and universities as much as the program of study, with the exception of education:

- The level of degree attainment did influence the duration of unemployment for education majors: the more advanced the degree the greater the chance of short-term unemployment.
- The duration of unemployment for graduates in the education program of study differed by the industry in which they were employed. For example, those employed in the education or health care sectors tended to find work more quickly than those in the information sector.

The analysis of the unemployment history of Indiana's public university and college graduates in the aftermath of the Great Recession points to the academic program of study having the most profound effect. With a few exceptions (such as education graduates), the degree level earned and the industry of one's employment has less influence on the chances and duration of unemployment.

INTRODUCTION

Economic downturns result in unemployment and prolonged periods of unemployment often lead to introspection. Whether it is politicians and policymakers reconsidering public policy or individuals questioning their career choices, labor market dynamics is the topic of the day.

Graduates and undergraduates alike dissect the rationale for pursuing their academic majors. Concerned parents question the economic viability of their children's chosen career paths. Government agencies forecast the types of jobs that will be in demand in the future, the media report which careers are the most "recession-proof" and educational institutions promote the majors that equip students for the jobs in highest demand. Nearly everyone wrings their hands because there are an insufficient number of students pursuing academic programs in the STEM disciplines of science, technology, engineering and math.

In these difficult economic times, the question boils down to this: In terms of employability, am I in the right profession? Or, if a student, am I studying the best academic discipline?

Do "recession-proof" careers or majors exist? How would one know?

With the turmoil wrought by the Great Recession compounded by the structural economic adjustments of transforming into an increasingly knowledge and service-based economy, these salient questions almost *demand* answers.

Until recently, exploring the relationships between programs of study and unemployment rates has not been possible on a national scale. A recent report by the Georgetown University Center on Education and the Workforce (GUCEW), using 2009 and 2010 American Community Survey data, found education and health majors had the lowest unemployment rates in the aftermath of the "Great Recession," while architecture and art majors had the highest. They also found, regardless of major, college graduates with more experience or graduate/professional degrees had lower unemployment rates than recent college graduates. The GUCEW report is national in scope and highlights the academic majors that can increase or decrease a graduate's risk of becoming unemployed during an economic downturn, but the study did not explore other questions about the effect of one's academic major once a person became unemployed. For example, how does one's academic program of study affect the chances of finding a job? Do employment opportunities vary by state?

Fortunately, new data sets can help address these questions. This analysis attempts to answer these questions for the state of Indiana. Using data from the Indiana Workforce Intelligence System (IWIS), this study explores the potential effect of academic majors on unemployment dynamics – the risks of becoming unemployed and the likely duration of unemployment. The study focuses on the experience of Indiana's public postsecondary

graduates¹ in the aftermath of the Great Recession from 2009 to 2010 when the unemployment rate remained persistently high.

This study is motivated by two questions:

1. Who are the unemployed? More specifically, what majors were most likely and least likely to become unemployed?
2. Who remains unemployed longer? Of those who become unemployed, what was the duration of unemployment by academic program of study?

THE AFTERMATH OF THE GREAT RECESSION

Methodology

The research team used a two-pronged analytical approach to better understand the effects of academic majors on unemployment dynamics following the Great Recession.²

Between 2009 and 2010, over 90 percent of the graduates examined were employed consistently – or at least did not file an unemployment claim.³ The first analysis estimated the probability of graduates becoming unemployed by major. This analysis also assessed the effect of academic major by degree level and industry. The second analysis considered the duration of unemployment by academic major for those graduates who were unemployed between 2009 and 2010.

The research team narrowed the analysis to include only those graduates who had some record of employment or unemployment in the state between 2009 and 2010 and for whom unambiguous statements could be made about their employment history. Graduates of public colleges and universities with no record of employment or who did not file for unemployment during this period may have left the labor force (to have

¹ Data for students attending, and graduates from, Indiana's private institutions of higher learning are not available in the IWIS data set. Even so, it is not unreasonable to infer that the experience of private university graduates, e.g. Notre Dame or Butler graduates, who remain in Indiana, would be similar to graduates from public colleges and universities who remain in the state.

² Although some graduates' unemployment spells preceded or extended beyond the study period, this study only analyzed weekly unemployment insurance claims filed between January 1, 2009 and December 31, 2010 for regular, extended and emergency unemployment compensation benefits.

³ Analysis includes graduates from any of Indiana's public postsecondary institutions between 1999 and 2008.

children, care for an elderly parent or just dropped out because they were discouraged), may have moved out of state or were employed out of state. Thus, to reiterate, this is an investigation using data on graduates from Indiana’s public institutions in order to make inferences about labor force dynamics in the state and not a study on all graduates of Indiana colleges and universities, either public or private.

Descriptive Statistics

Of the nearly 376,000 students who graduated from one of Indiana’s public colleges and universities between 1999 and 2008, over 178,000 had a verifiable employment history in Indiana between 2009 and 2010. Nearly 89 percent of these cohort graduates were white, 5 percent were black and approximately 3 percent did not disclose their race. Female graduates (106,628) outnumbered their male counterparts (70,782) by nearly 36,000 graduates. Less than 1 percent of the graduates did not disclose their sex.

Over half of the graduates – 51.6 percent – were traditional college age (18-24 years old). The second- and third-highest concentrations were 25-29 year olds (19.8 percent of the cohort) and 30-34 year olds (10.3 percent of the cohort). In total, nearly 82 percent of the graduates were between the ages of 18 and 34.

Bachelor’s degrees were the most popular degrees conferred (53.7 percent) followed by associate degrees (22.0 percent) and master’s degrees (14.8 percent).

Five majors accounted for over two-thirds of all graduates – health (19.3 percent), business (17.6 percent), education (15.7 percent), humanities and liberal arts (8.3 percent), and engineering (6.7 percent).

Over 75 percent of the graduate cohort occupied five industry sectors – health care and social assistance (23.7 percent), education services (21.0 percent), professional and business services (12.2 percent), manufacturing (10.2 percent), and finally retail and wholesale trade (8.8 percent).

The Probability of Becoming Unemployed

The first analytical approach calculated how a graduate’s unemployment⁴ may have been affected by a program of study and degree level during 2009 and 2010. The research team focused on how the probability of filing unemployment claims during this period varies by academic major, degree level and industry.

Academic Major

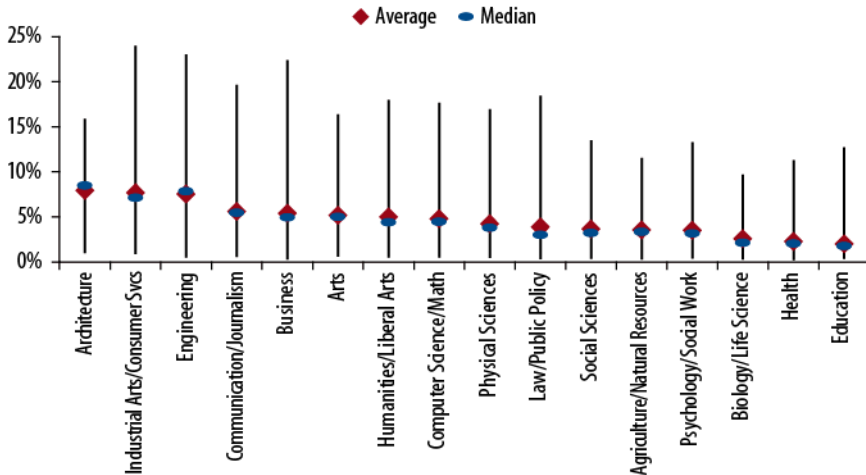
Sixteen programs of study⁵ were sorted into three categories based on their rate of unemployment to show which majors weathered the most recent economic storm better than others. The “High 3” majors had the

⁴ The unemployment rate was calculated by dividing the number of unemployed graduates in a category by the number of graduates in that category. This study analyzed unemployment rates using three different categories: academic major only, academic major and degree level, and academic major and industry.

⁵ The major academic groups were patterned after the report, “What’s It Worth: The Economic Value of College Majors,” conducted by the Georgetown Center for Education and Workforce (<http://cew.georgetown.edu/whatsitworth>). A listing of the majors in each group is available at <http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/majorslist.pdf>.

highest probability of becoming unemployed while the “Low 3” had the lowest probability. There were 10 programs of study in the middle of the pack that made up the “Middle 10.” As **Figure 1** shows, graduates in architecture (7.9 percent), industrial arts/consumer services (7.7 percent) and engineering (7.5 percent) had the highest average probabilities of becoming unemployed. One out of every 13 graduates in these High 3 majors experienced some period of unemployment between 2009 and 2010.

FIGURE 1: UNEMPLOYMENT RATES BY ACADEMIC MAJOR



N = 177,501

Note: The bars show the distribution of the experience of the graduates in those programs of study, like the high-low-close graphs that are used by brokerage houses to track a stock's trading price. For example, industrial arts and consumer service graduates had a very wide range of employment experience. The graph is sorted by the average unemployment rate.

Source: IBRC, using data from the Indiana Workforce Intelligence System

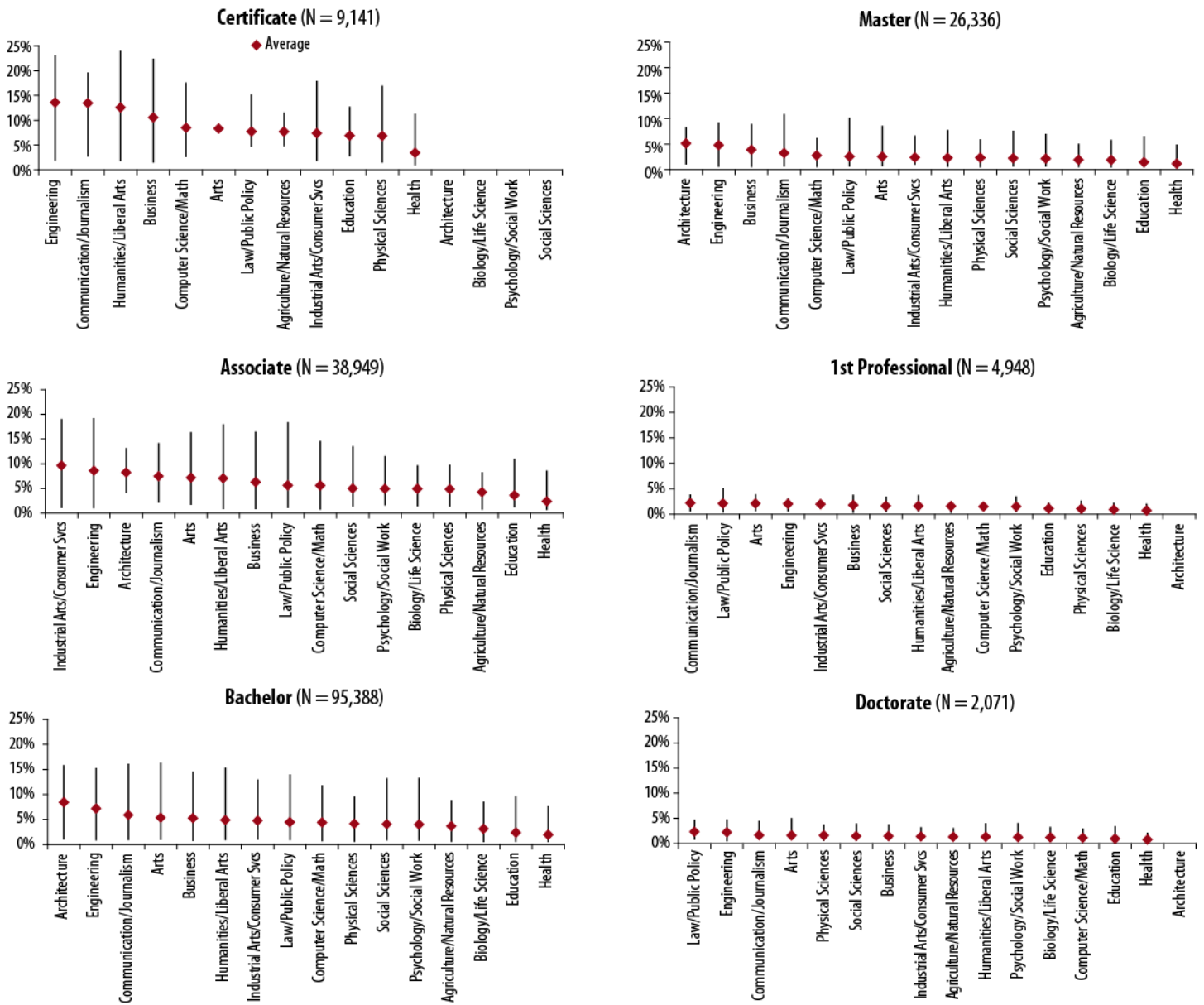
In contrast, approximately one out of every 44 graduates in the Low 3 majors experienced some unemployment in 2009 and 2010. Graduates in biology/life science (2.5 percent), health (2.3 percent) and education (2.0 percent) had the three lowest average probabilities of experiencing unemployment. The remaining majors had average unemployment rates ranging from 5.6 percent (communication/journalism) down to 3.5 percent (psychology/social work).

Averages don't always tell the whole story. The experience for a specific major or a subset of individuals may not conform to a broad category's average. **Figure 1** also presents the *range* of unemployment rates across academic majors. That range of experience among industrial arts/consumer services and engineering majors (in the High 3) and business majors (in the Middle 10) had the broadest ranges of unemployment probabilities. This means that graduates in some of the specific majors within each of these groupings had more than a 20 percent chance of being unemployed between 2009 and 2010. These broad ranges indicate that even within a similar program of study, specific majors varied widely in their employment experience.

Academic Major and Degree Level

Figure 2 offers another perspective of how the probability of becoming unemployed varies by academic major and the level of degree attainment.

FIGURE 2: UNEMPLOYMENT RATES BY ACADEMIC MAJOR AND DEGREE LEVEL—SORTED



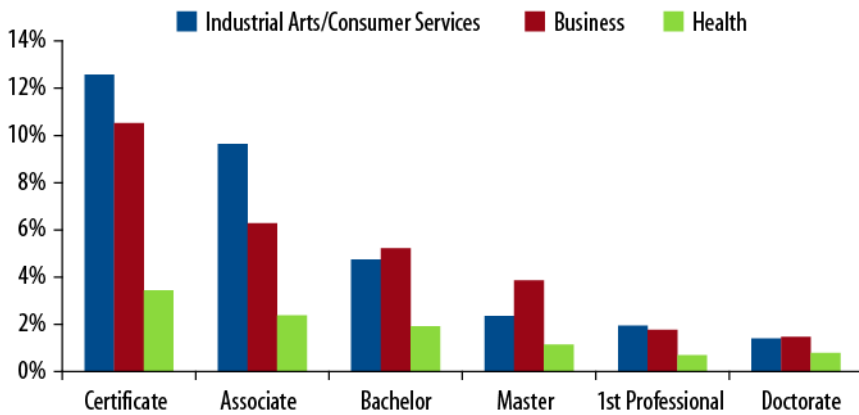
N = 176,833; Graduate certificates are not shown.
 Note: Majors without observations indicate that there were no graduates for that degree level.
 Each graph is sorted by the average unemployment rate.
 Source: IBRC, using data from the Indiana Workforce Intelligence System

Health-related majors are the programs of study with the least probability of being unemployed, regardless of degree level. Compared to other levels of degree attainment, sub-baccalaureate graduates had wider ranges of unemployment probability. For example, certificate holders in engineering, industrial arts/consumer services and business had more than a 20 percent chance of becoming unemployed between 2009 and 2010.

A close inspection of **Figure 2** shows that the majors with the greatest chance of being unemployed depends on the degree level. For example, among bachelor’s degree recipients, communication/journalism graduates had a greater chance of being unemployed – the third greatest probability slot among bachelor’s – than industrial arts/consumer services majors. At the master’s degree level, business graduates moved into the third-highest unemployment probability slot. The academic majors with the lower chances of becoming unemployed also differed based on degree level, but the majors of biology/life science, health and education still have a general lock on the programs of study with the least chance of being unemployed.

Higher levels of educational attainment typically corresponded to lower average unemployment rates across majors. **Figure 3** underscores this point. The average likelihood of becoming unemployed declined as degree attainment rose for each program of study category.

FIGURE 3: AVERAGE UNEMPLOYMENT RATE BY DEGREE LEVEL FOR SELECT MAJORS

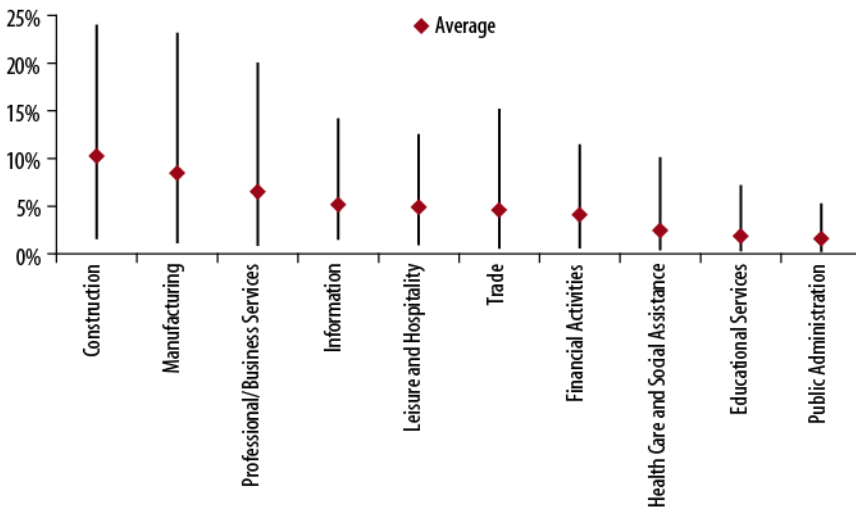


Note: Certificate credentials are associated with undergraduate degrees. Graduate certificates are not included.
 Source: IBRC, using data from the Indiana Workforce Intelligence System

Academic Major and Industry

In addition to analyzing the combined effects of academic major and degree level on the risk of becoming unemployed, the research team also investigated how field of study and industry interact to influence a graduate’s employment experience. **Figure 4** shows unemployment rates by industry sector.

FIGURE 4: INDUSTRY UNEMPLOYMENT RATES FOR SELECT INDUSTRIES



Note: This graph shows the top 10 industries by degree counts and is sorted by the average unemployment rate.
 Source: IBRC, using data from the Indiana Workforce Intelligence System

As it happens, when it comes to unemployment vulnerability, the program of study is a more significant influence than industry. This should not be surprising. On the employment resilience side, health majors tend to work in the health care industries and education majors tend to work in the education sector. On the employment vulnerability side of the spectrum, both engineers and architects tend to work in construction⁶ and professional and business services. (Figure A-1 in the Appendix shows unemployment rates by academic major and industry.)

This finding underscores how important academic majors, and their subsequent careers, are in determining whether Indiana’s public postsecondary graduates became unemployed during the Great Recession and its aftermath.

While the large majority of graduates stayed employed – or at least did not file for unemployment – between 2009 and 2010, the above analysis shows how academic majors affected the probability of *becoming* unemployed.

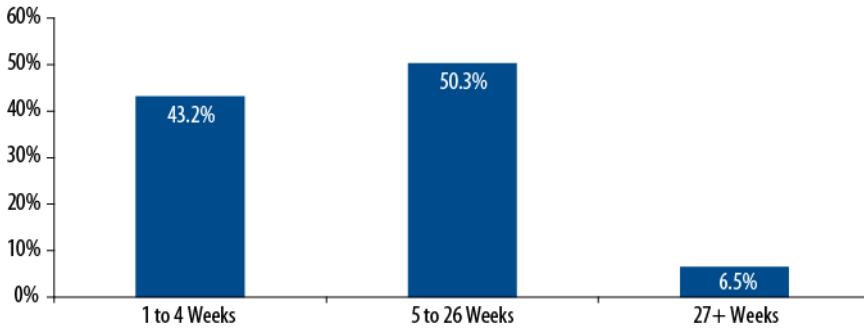
The Probability of Remaining Unemployed

But what about those who did experience some unemployment during this time period? Did the program of study affect the duration of their unemployment – or their probability of *staying* unemployed?

⁶ Even during stable economic times, the construction industry’s unemployment rate fluctuates seasonally between peaks in the winter months and troughs in the summer months. Data from the Bureau of Labor Statistics show that during the Great Recession the construction industry’s inherent level of seasonal unemployment increased substantially. For more information, see historic unemployment data under Workforce Statistics on www.bls.gov/iag/tgs/iag23.htm.

The second prong of the study used a subset of the 178,000 graduates – namely, the 7,400 individuals who were unemployed for at least a portion of the time period – to assess the effect these programs of study had on the duration of unemployment. On average, the unemployed subset had just over a 50 percent chance of being out of work from 5 to 26 weeks. The chance of short-term unemployment (1 to 4 weeks) was 43 percent, while the chance of prolonged unemployment (over 27 weeks) was 7 percent (see **Figure 5**). However, no program of study, degree earned or industry of employment is “just average.”

FIGURE 5: PROBABILITY OF STAYING UNEMPLOYED

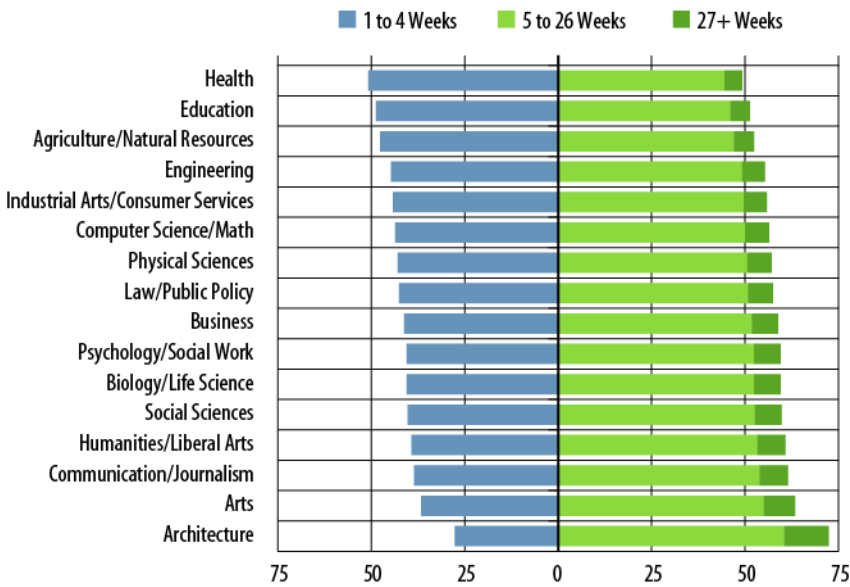


N = 7,426
 Source: IBRC, using data from the Indiana Workforce Intelligence System

Unemployment Duration by Academic Major

Figure 6 shows, by program of study, the probability of being unemployed for each duration length: short-term (1 to 4 weeks), typical (5 to 26 weeks) and prolonged (over 27 weeks). When totaled, all three duration outcomes equal 100 percent. The academic majors in health, education and agriculture/natural resources had the three greatest likelihoods of short-term unemployment, compared to graduates with other majors. Conversely, graduates in communication/journalism, the arts and architecture had the three lowest probabilities of their unemployment being short-term. Graduates in these majors also have the three highest probabilities of prolonged unemployment.

FIGURE 6: PROBABILITY OF UNEMPLOYMENT DURATION BY ACADEMIC MAJOR



N = 7,426

Note: The graph is sorted by short-term (1 to 4 weeks) unemployment. When totaled, all three duration outcomes equal 100 percent.

Source: IBRC, using data from the Indiana Workforce Intelligence System

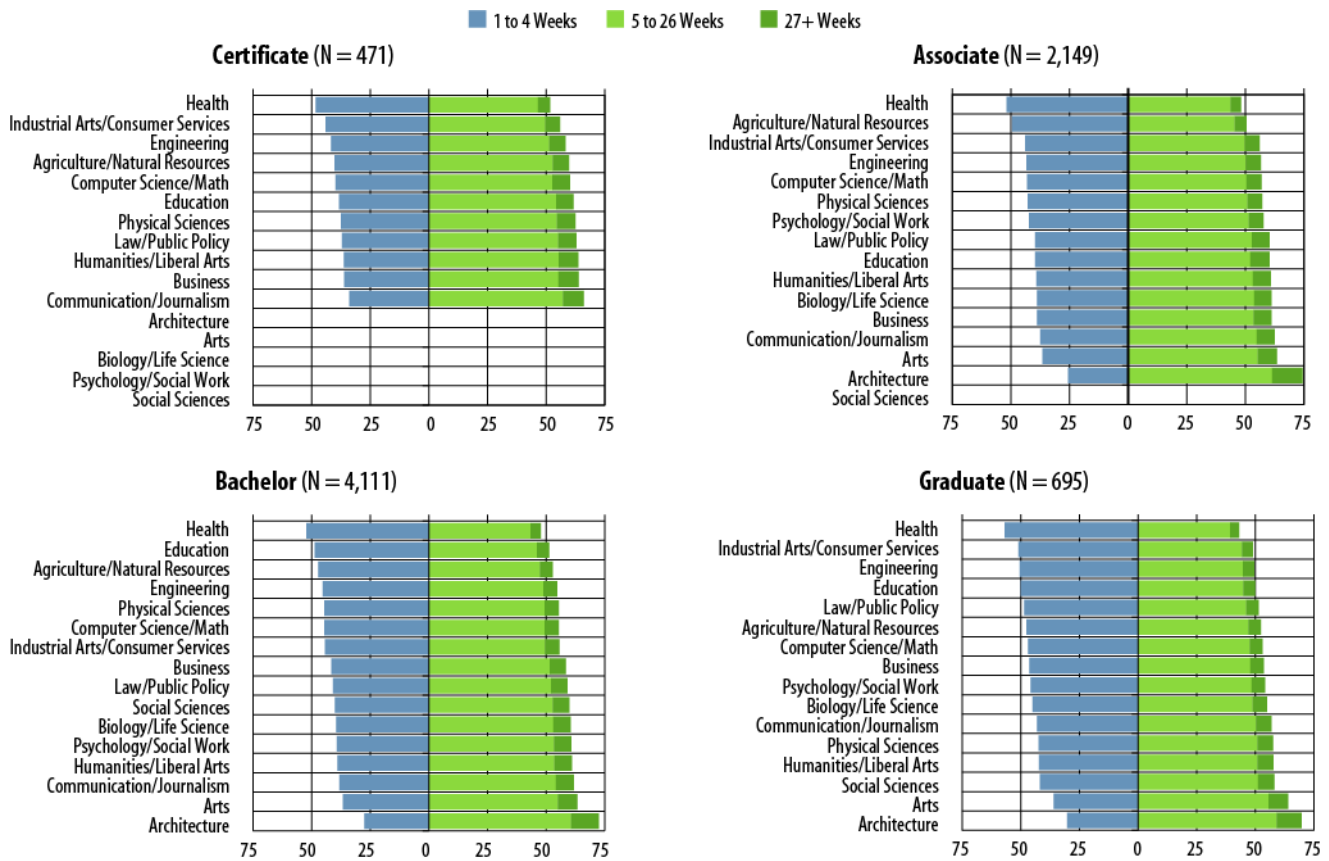
Health and education graduates had the lowest chances of becoming unemployed, as well as staying unemployed. If graduates in these majors did become unemployed, they had the highest probability – over a 50 percent chance – of being unemployed a month or less. Biology/life science graduates, despite a relatively low probability of becoming unemployed, did not fare as well in terms of unemployment duration. If they became unemployed, they had over a 52 percent chance of staying unemployed between 5 to 26 weeks. Compared to the duration of unemployment of other programs of study, the biology/life sciences were in the middle of the pack.

While architecture, industrial arts/consumer services and engineering programs of study have the highest probability of unemployment, it is architecture graduates that suffer the double whammy of also having high probabilities of typical and prolonged joblessness. In contrast, engineering and industrial arts/consumer services may have a relatively high probability of losing a job, but they had the fourth- and fifth-highest probabilities of short-term unemployment duration. Their greater risk for becoming unemployed may be somewhat offset by their relatively lower risk of staying unemployed long.

Unemployment Duration by Academic Major and Degree Level

Overlaying the academic program of study with the level of degree attainment presents results consistent with the above – namely, it is mostly about the program of study. **Figure 7** presents unemployment duration by both academic program and degree level. Health majors consistently have the highest probability of short-term unemployment, irrespective of the level of degree. It is for other programs of study and degree level that there are differences in unemployment duration.

FIGURE 7: PROBABILITY OF STAYING UNEMPLOYED BY MAJOR AND DEGREE LEVEL



N = 7,426

Note: Majors without observations indicate either no graduates or no unemployed graduates between 2009 and 2010 for that degree level. Each graph is sorted by short-term (1 to 4 weeks) unemployment. When totaled, all three duration outcomes equal 100 percent.

Source: IBRC, using data from the Indiana Workforce Intelligence System

While industrial arts/consumer service graduates have relatively high probabilities of becoming unemployed, its certificate and associate degree recipients have a relatively better chance of not staying unemployed long. In contrast, education graduates with sub-baccalaureate degrees who become unemployed did not fare as well. Despite having the third-lowest (certificate holders) and second-lowest (associate degree recipients) chances of becoming unemployed, their likelihood of returning to work, once unemployed, is in the middle of the pack. For example, education majors with associate degrees ranked ninth out of 15 programs of study.

These patterns – that programs of study tend to determine the length of unemployment more than the level of degree earned – are also evident when looking at unemployment duration by industry.

Unemployment Duration by Academic Major and Industry

Health and agriculture/natural resources graduates held the two highest likelihoods of short-term unemployment (being out of work 1 to 4 weeks) in the industries where they were once employed. In contrast, architecture and arts majors suffered the lowest prospects of short-term unemployment in every industry

where they were employed. The probability of short-term unemployment for education graduates tended to be industry dependent. Their prospects of short-term unemployment ranged from the second best probability in both the health care and social assistance sector and the information sectors to middle of the pack (ninth place) in public administration.

Figure A-2 in the Appendix presents how the risk of staying unemployed varied by academic major and industry.

CONCLUSION

Hoosier graduates from Indiana’s public postsecondary colleges and universities who majored in biology/life science, health or education typically had the lowest unemployment rates. On the other hand, the graduates majoring in architecture, industrial arts/consumer services and engineering had the highest chances of becoming unemployed. The unemployment experience of Hoosiers was more closely aligned with one’s academic major than with the degree level or industry of former employment. This suggests that choice of academic major can greatly influence a graduate’s probability of becoming unemployed during a severe economic downturn.

Our analysis also suggests that one’s academic program of study can also influence another aspect of unemployment – how long it takes to find a new job. Health and education graduates not only had two of the lowest probabilities of becoming unemployed, they also had a better chance of finding new work relatively quickly if they became unemployed. When compared across degree levels, however, the likely duration of unemployment for these majors diverged. While health graduates retained the highest probability of short-term unemployment, education graduates did not fare as well. For programs of study applicable to certificates, education ranked sixth out of 11 programs; among associate degree recipients, education ranked ninth out of 15 programs; and for graduate degree holders, education ranked fourth out of 16 academic programs of study. In short, education graduates had generally low probabilities of becoming unemployed, but their duration of unemployment, compared to other academic majors, depended upon their level of degree attainment.

The experience of graduates from the programs of study most vulnerable to unemployment – namely, architecture, industrial arts/consumer services and engineering – were not consistent. The duration of unemployment differed for these majors. Architecture majors tended to have more prolonged unemployment and a much lower chance of short-term unemployment. This tendency held irrespective of the degree level for the architecture graduates. Engineering and industrial arts/consumer services, on the other hand, had better than average chances of short-term unemployment and a lower than average chance of prolonged unemployment.

What affects the probability and duration of unemployment more: Academic program of study? The level of degree attained? The industry of one’s employment? Our analysis of the employment history of Indiana’s public university and college graduates in the aftermath of the Great Recession points to the academic

program of study having the most profound effect. With a few exceptions, such as education graduates, the level of degree earned and the industry on one's employment has less influence on the chances and duration of unemployment.

APPENDIX

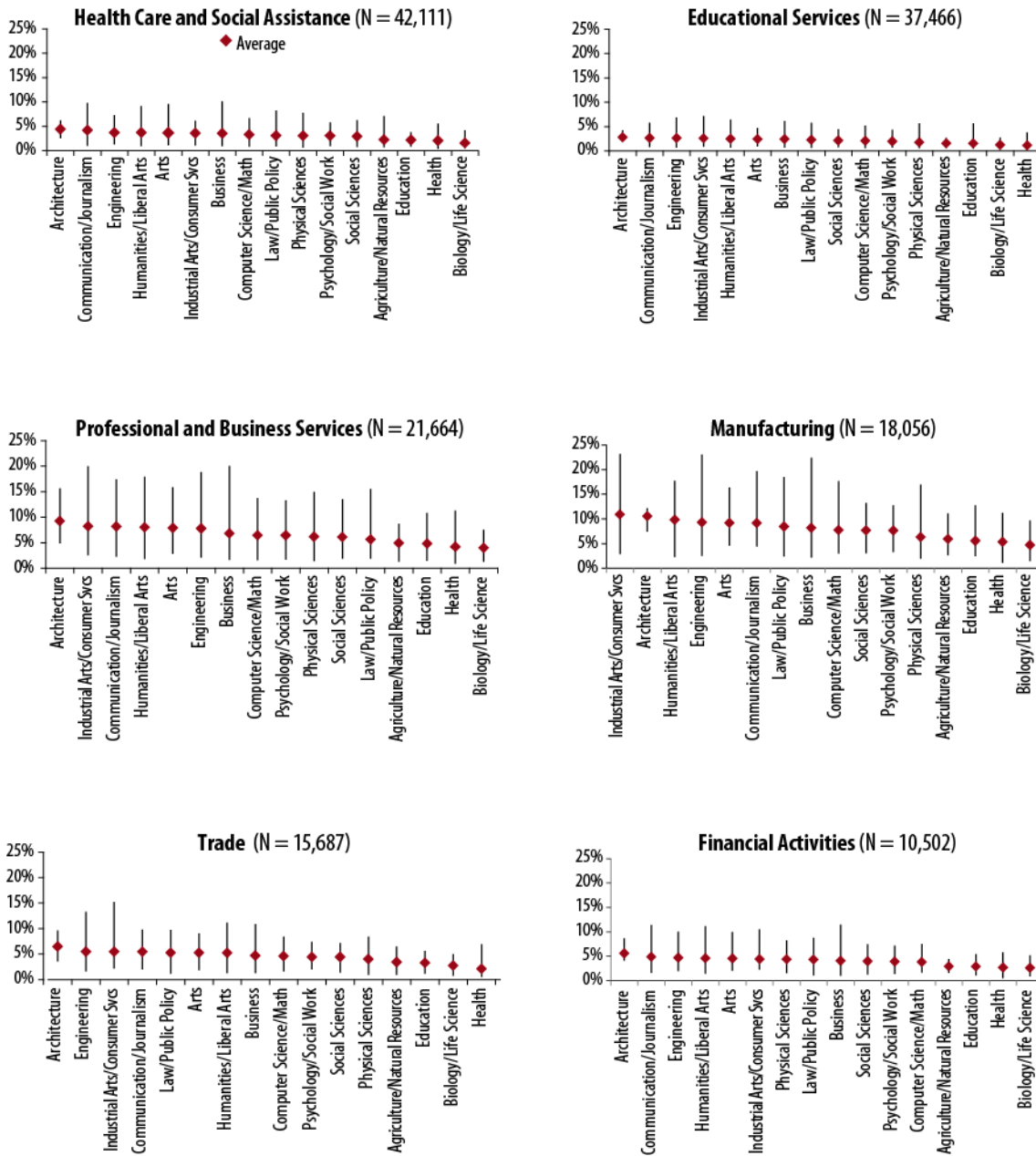
Probability of Becoming Unemployed by Major and Industry

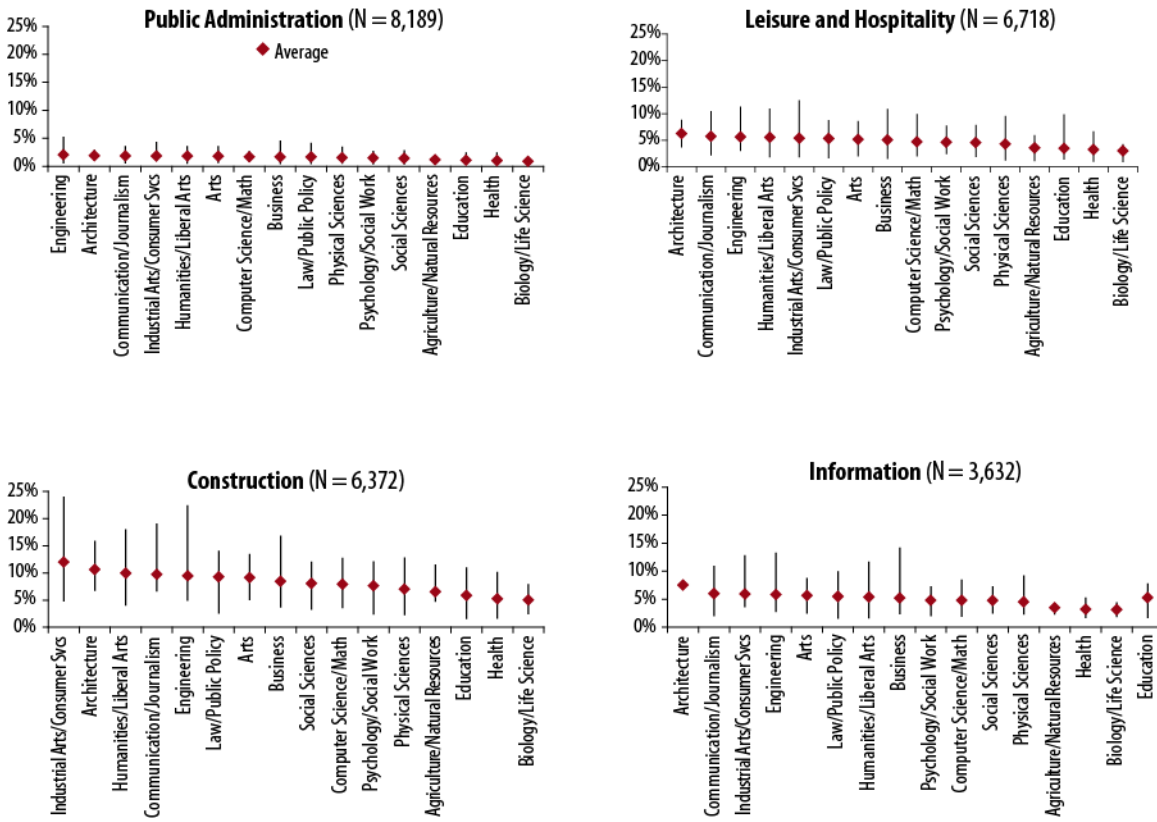
Two of the three majors hardest hit by the Great Recession and its aftermath – architecture, industrial arts/consumer services and engineering – had high chances of becoming unemployed regardless of industry (see **Figure A-1**). Architecture and engineering graduates working in the sectors of health care and social assistance, educational services, financial activities, public administration, and leisure and hospitality all had high unemployment rates, compared to graduates with other academic concentrations working in those industries.

The three majors with the lowest potential for becoming unemployed were consistently lower across industry sectors – except one. In the health care and social assistance sector, agricultural/natural resources graduates edged out education graduates for the third-lowest unemployment probability.

The industries with the highest average unemployment rates also had the greatest range of unemployment probabilities. **Figure 4** shows that the construction and manufacturing sectors had the two highest industry unemployment rates, but **Figure A-1** shows some industrial arts and engineering graduates working in these industries had unemployment rates over 20 percent.

Figure A-1: Probability of Becoming Unemployed by Major and Industry





N = 170,397
 Note: Only the top 10 industries by degree counts are shown.
 Each graph is sorted by the average unemployment rate.
 Source: IBRC, using data from the Indiana Workforce Intelligence System

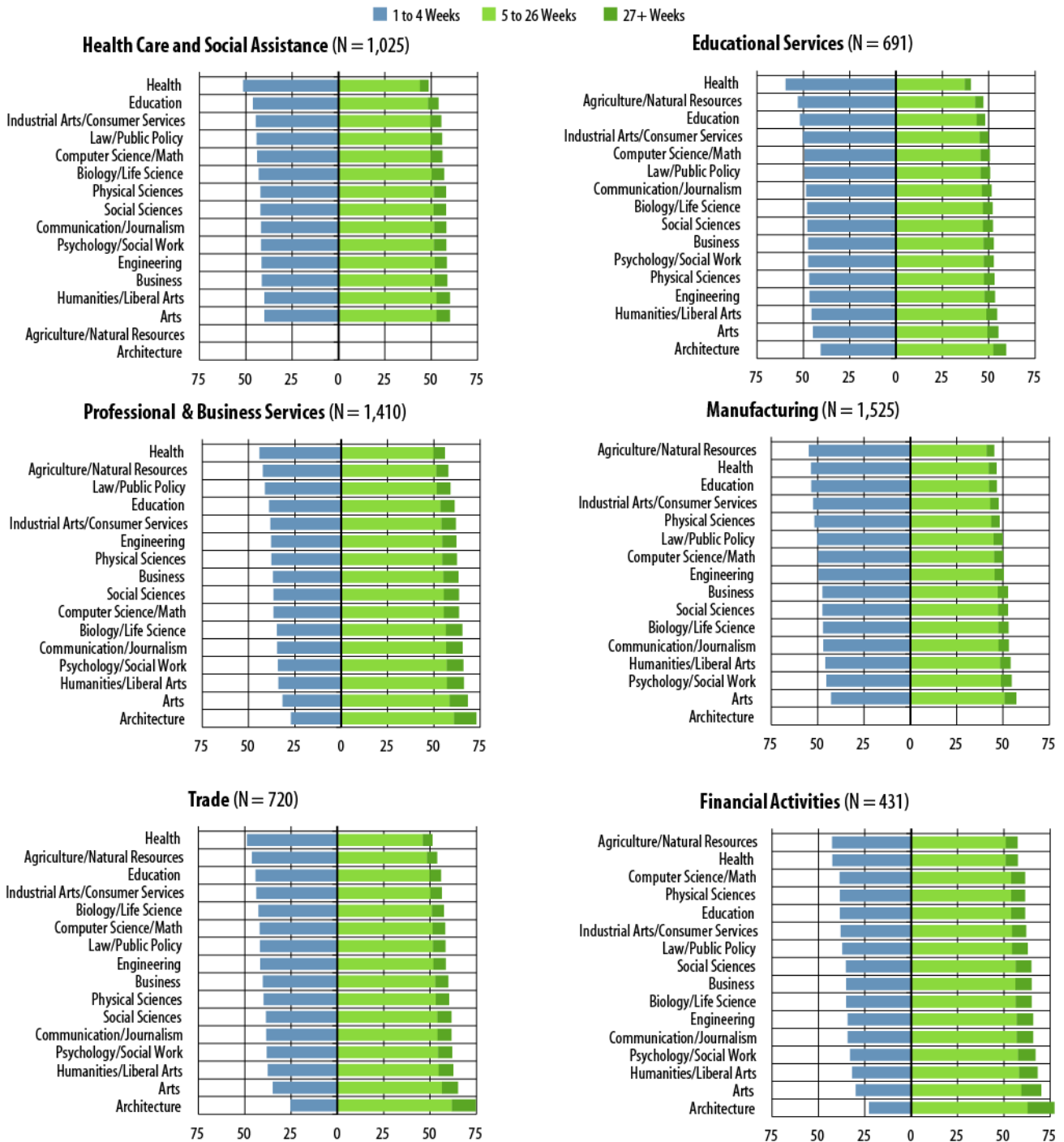
Duration of Unemployed by Major and Industry

Figure A-2 illustrates how the risk of staying unemployed varied by academic major and industry.

Some of the majors at each end of the short-term unemployment spectrum varied little by industry. Health and agriculture/natural resources graduates, for example, held the two highest likelihoods of only being out of work 1 to 4 weeks in all of the industries where they were once employed. On the other end of the spectrum, the challenging unemployment realities for architecture and arts majors were consistent across industries: unemployed architecture and arts majors had the lowest prospects of short-term unemployment and tended to have greater chances of prolonged unemployment in every industry where they were employed.

The probability of short-term unemployment for education graduates was more industry dependent. Their prospects of short-term unemployment ranked second-highest in both the health care and information sectors but fell to ninth in the public administration sector. In the educational services industry, education graduates ranked third behind health and agriculture/natural resources graduates in being unemployed short-term.

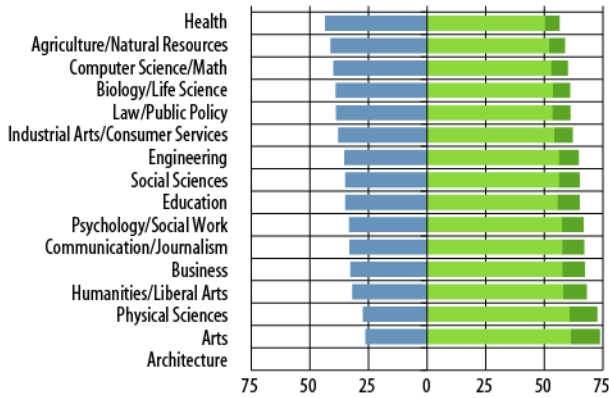
FIGURE A-2: PROBABILITY OF STAYING UNEMPLOYED BY MAJOR AND INDUSTRY



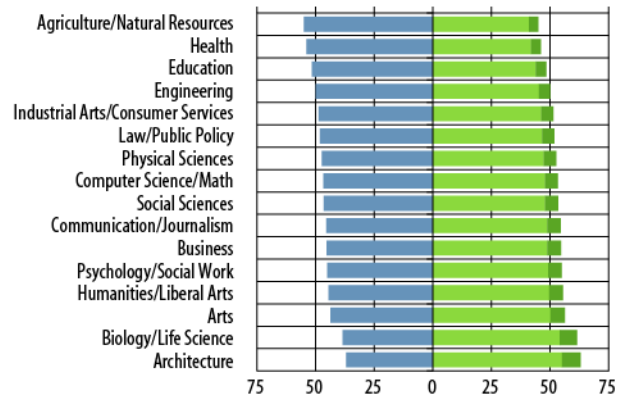
MAJOR UNEMPLOYMENT: HOW ACADEMIC PROGRAMS OF STUDY AFFECT HOOSIER UNEMPLOYMENT PATTERNS

■ 1 to 4 Weeks ■ 5 to 26 Weeks ■ 27+ Weeks

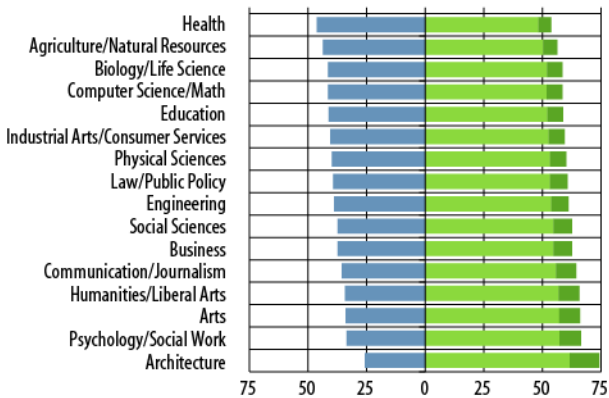
Public Administration (N = 131)



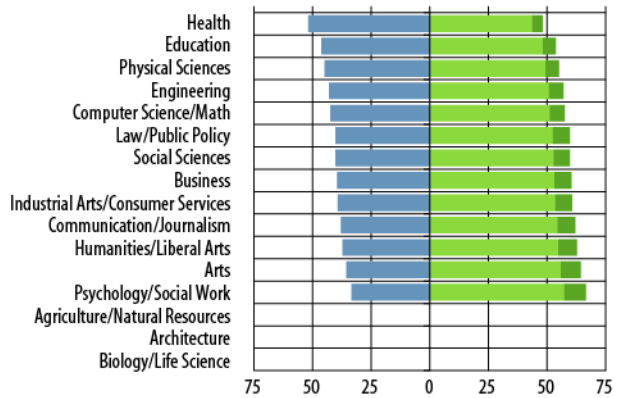
Leisure & Hospitality (N = 328)



Construction (N = 653)



Information (N = 187)



N = 7,101

Note: Only the top 10 industries by degree counts are shown. Graphs are sorted in descending order by short-term (1 to 4 weeks) unemployment. When totaled, all three duration outcomes equal 100 percent. Majors without observations indicate either no graduates or no unemployed graduates between 2009 and 2010 in the industry.

Source: IBRC, using data from the Indiana Workforce Intelligence System