

# How Education Pays

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The Work Outcomes of Indiana's Postsecondary Graduates

A Research Brief from the  
Indiana Workforce  
Intelligence System

November 2011



**IWIS** indiana workforce  
intelligence system

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*Integrating data to understand Indiana's human capital*

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**Indiana Business Research Center**  
Indiana University Kelley School of Business



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*The views expressed in this publication are those of the authors and do not necessarily represent those of Lumina Foundation, their officers, or employees.*

# Executive Summary

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Manufacturing has long been a strength for Indiana, providing hundreds of thousands of Hoosier high school graduates access to the middle class standard of living. But manufacturing also tops the list of higher paying industries for college graduates. For the cohort of Hoosier-educated graduates whose earnings were measured one year and five years after graduation, the industries with the higher wages tended to be in manufacturing—particularly in chemical manufacturing.

Manufacturing, however, was not the sector absorbing the greatest percentage of Indiana graduates. Educational services—the industry that includes K-12 through university-level education—not only produces degrees, it also leads in hiring graduates with degrees. Following education, the array of health care industries absorbed the greatest number of degree holders educated by Indiana public institutions of higher learning.

A large majority of the state’s sub-baccalaureate graduates remain in the state and, immediately after earning their credential, these graduates earned wages nearly equal to or higher than bachelor’s degree recipients. Over time, however, the wages for bachelor’s degree recipients grew more rapidly than sub-baccalaureate graduates.

Fifty-nine percent of the 2000 to 2005 cohort that earned bachelor’s degrees from Indiana’s public higher education institutions remained in the state one year after graduation. Five years after graduation, only 43 percent of bachelor’s degree holders remained in the state.

The data also show that women who earned credentials of all types tended to remain in the state to work. Six out of every 10 female graduates—from certificates to doctors of philosophy—remain in the state while only four out of 10 male graduates remained.

Those who remained in the state also tended to congregate in the educational and health care services industries.

This educational outcomes study measured the wages of a five-year cohort (2000 to 2005) of all types of graduates—associate, bachelor’s, professional, doctoral and other certifications—from Indiana public colleges and universities one-year and five-years after earning their credentials.

# Introduction

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This report documents how postsecondary education affects work and income outcomes. It attempts to answer several questions:

- What are the work outcomes of all postsecondary graduates from Indiana’s public colleges and universities one year and five years following graduation?
- In what industries are graduates employed?
- How do these employment patterns vary by degree level, gender, race and time?

To answer these questions, researchers used Indiana’s Workforce Intelligence System (IWIS). IWIS is an information resource designed to support the needs of Indiana policymakers, program administrators, educators and other stakeholders who need to understand the Hoosier talent-building and talent-using pipeline. IWIS is an information system created and maintained by a collaborative multi-agency effort among the Department of Workforce Development (DWD), the Commission on Higher Education (CHE) and the Department of Education (DOE), with links to additional state agencies as needed for specific analyses. IWIS does not collect new data but rather integrates existing data already in state databases.

These integrated data are well suited for analyzing changing trends over time and relationships among policy-relevant variables. Collectively, IWIS allows researchers to identify educational and employment patterns and the corresponding income implications of those patterns. IWIS allows researchers to match wage and educational data containing the highest degree earned, the dominant<sup>1</sup> industry the individual was employed in and their wages one year and five years following graduation. Through this analysis, the research team was able to assess remain rates by degree level, mobility across industries and a range of other research points.

The report that follows summarizes the research findings. There is considerably greater detail available if the reader should so desire. For those who want to dig deeper, there is a companion spreadsheet with more data, detailed tables and cross-tabulations. Each section of this report identifies the relevant location of the detailed data and analysis in the companion file at [www.iwis.in.gov/documents/HowEducationPays.xlsx](http://www.iwis.in.gov/documents/HowEducationPays.xlsx).

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<sup>1</sup> Dominant industry refers to the industry where the individual obtained the highest share of their wages in a given year.

# Work Outcomes of Postsecondary Graduates

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Determining the work outcomes of Indiana’s postsecondary graduates provides valuable insight on the industries graduates are entering and their wage by degree level. Likewise, IWIS data can help describe the characteristics of graduates who remain in Indiana by degree, mobility across industries and a breakdown of results by gender and race. As one may anticipate, a higher percentage of sub-baccalaureate degrees (certificates and associate degrees) remained in the state compared to other graduates. The health care industry is a dominant employer of the state’s graduates—particularly among women. The health care industry does not pay the highest average wage, however. Initially, the first year after completing a degree, sub-baccalaureate and bachelor’s degree recipients had similar earnings, but in the longer run—five years after receiving their degrees—those with bachelor’s degrees had more earning power.

## Methodology

The data used for this study captured students who graduated from Indiana’s public colleges and universities between 2000 and 2009.<sup>2</sup> IWIS provided matching wage data from 2001 to 2010. A graduate’s highest degree level was used to determine their educational attainment, and their educational status was then linked to wage data. To assess how work outcomes varied over time, a specific cohort of graduates was created for those who were awarded their credential between 2000 and 2005 and who were employed in Indiana both one year and five years after they graduated. Based on these restrictions, the cohort of 95,237 represents 25.1 percent of all graduates between 2000 and 2009.

In order to compare the experiences of the individuals in the cohort, each person needed a single educational and wage record. The research team had to address the issues of dual degrees at the time of graduation and multiple racial designations. For both of these scenarios, researchers applied a tie-breaker so that the data were not misinterpreted. Wage records also had to be harmonized on both quarterly and annual bases. In addition to the total wages earned, researchers also had to identify the dominant industry—that is, the industry where the individual earned most of her or his wages.

The work outcomes (that is, total wage and the dominant industry) for each graduate were captured at two specific time periods: one year and five years after they graduated. The research team assumed a May graduation and used the subsequent calendar year as the basis for “one-year” wages. Thus, if a person graduated in the 2001-2002 school year, first-year wages were captured in the 2003 calendar year and five-year wages were captured in 2007 calendar year. Similarly, one- and five-year variables were constructed using the graduates’ dominant industry wages.

## Descriptive Statistics

### Graduate Demographics

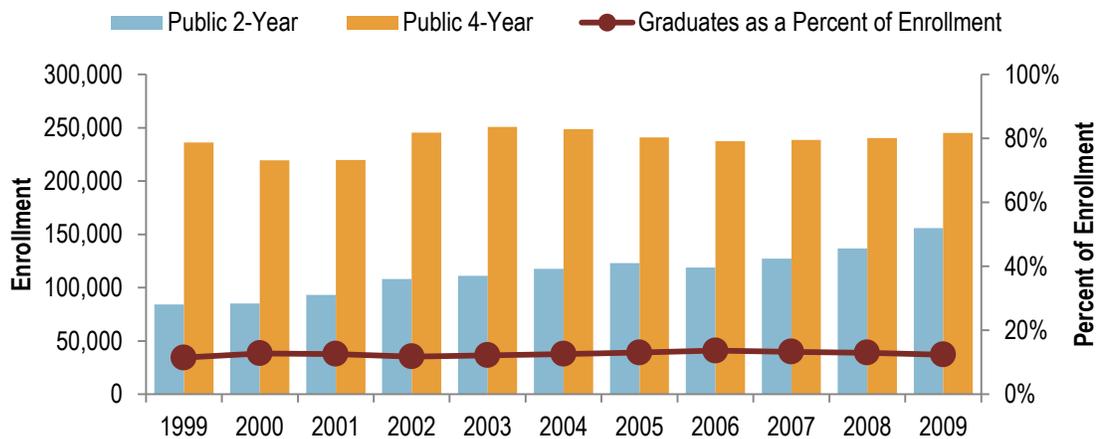
To provide context, this section briefly describes graduates as percent of enrollment from 2000 to 2009 and compares key demographic data of the cohort against all of Indiana’s public postsecondary graduates.

According to the Integrated Postsecondary Education Data System (IPEDS), between 2000 and 2009, total enrollment at Indiana’s public postsecondary institutions rose 31.8 percent, from 304,406 to 401,213 students. Two-year institutions accounted for a majority of this growth. Enrollment at two-year institution nearly doubled from 85,000 in 2000 to 156,000 in 2009. **Figure 1** shows enrollment trends for both two- and four-year institutions and plots the number graduates relative to total enrollment. In 2009, graduates comprised 12.4 percent of all enrolled students, which is a decline from the peak of 13.6 percent in 2006. Over the nine-year period, the average share of graduates to enrolled students was 12.6 percent.

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<sup>2</sup> Therefore, private and for-profit postsecondary institutions are not represented in this study.

**Figure 1: Annual Enrollment by Institutional Type and Graduates as Percent of Enrollment (GPE)**



Source: Integrated Postsecondary Education Data System (IPEDS)

Between 2000 and 2009, the graduate universe of 378,451 individuals received degrees from a public postsecondary institution in Indiana (see **Table 1**). Of these graduates, the majority obtained their bachelor’s degree. Of the graduate universe, the percentage of those earning associate degrees and those earning master’s degree recipients were about equal. All graduates between 2000 and 2005—the group of timeframe graduates—obtained a slightly larger share of advanced degrees (beyond bachelor’s) than the universe, 25.1 percent versus 22.7 percent, respectively.

**Table 1: Share of Graduates by Educational Attainment, 2000-2009**

Highest Educational Attainment	Graduate Universe 2000-2009	Timeframe Graduates 2000-2005	Cohort Graduates 2000-2005
All Certificates	4.1%	4.0%	6.3%
Associate Degree	17.0%	15.6%	23.9%
Bachelor's Degree	56.2%	55.3%	53.7%
Master's Degree	16.7%	18.3%	12.7%
Doctorate Degree	2.8%	3.1%	0.8%
First Professional Degree	2.8%	3.4%	2.5%
Other	0.4%	0.3%	0.2%
<b>Total</b>	<b>378,451</b>	<b>220,874</b>	<b>95,237</b>

Note: Other includes post-baccalaureate and post-master’s certificates.

The relevant cohort of graduates for this study—those that remained in Indiana and earned wages both one and five years after graduation—did not mirror the profile of all those graduating between 2000 and 2005. Within the cohort, a greater share of the graduates earned sub-baccalaureate degrees (30.1 percent vs. 19.6 percent for the timeframe graduates) and a much smaller share have degrees beyond bachelor’s degrees (16.1 percent vs. 25.1 percent for the timeframe graduates). Therefore, based on educational attainment levels, those that remain in Indiana have, on average, a smaller proportion of advanced degrees.

**Table 2** shows that women obtained a higher share of postsecondary degrees than men in the past decade, accounting for nearly 55 percent of all graduates and nearly 60 percent of the cohort. The data do not explain why women are obtaining more degrees or why a greater percentage of female graduates stayed in Indiana. One could speculate that this relates to the types of degrees women earn compared to men and that there are more opportunities within Indiana for people with those degrees.

**Table 2: Share of Graduates by Gender, 2000-2009**

<b>Gender</b>	<b>Graduate Universe 2000-2009</b>	<b>Timeframe Graduates 2000-2005</b>	<b>Cohort Graduates 2000-2005</b>
Male	44.5%	44.5%	39.5%
Female	54.7%	54.8%	59.6%
Unknown	0.8%	0.8%	0.8%
<b>Total</b>	<b>378,451</b>	<b>220,874</b>	<b>95,237</b>

The age distribution for the three groups—universe, timeframe and cohort graduates—was similar. In each case, over 50 percent of graduates were traditional college-age (18-24 years old). The second- and third-highest concentrations in each group were 25-29 year olds and 30-34 year olds. Over 80 percent of graduates across all three groups were between 18-34 years old.

While not all individuals indicated their race and ethnicity, the majority of graduates were Caucasians (over 80 percent)

followed by those who did not indicate their race or ethnicity (nearly 8 percent) and black/African Americans (about 5 percent). This finding held true for both the universe and timeframe graduates. However, in the cohort, black/African Americans were the second-highest race followed by unknown.<sup>3</sup>

In summary, IWIS data show the “typical” postsecondary graduate of Indiana’s public colleges and universities was a Caucasian female aged 18-24 years old who received a bachelor’s degree. This description of the typical student holds true for all three graduate groups—universe, timeframe and cohort.

## Remain-Rates

Questions about whether Indiana suffers from brain drain or benefits from brain gain can be partially answered using the data in IWIS. IWIS can help determine graduate “remain-rates,” a slight change in terms to maintain the distinction between the number of students that continue their educational program—retention—and graduates that remain in the state. The salient question for the current analysis is: how many graduates between 2000 and 2005 were employed in the state one year or five years after graduation? The IWIS data are not perfect, however, because the data are built from wage records in the state. As a result, it does not capture whether a student graduated and moved out of the state, whether a student was continuing their education at a private or out-of-state institution, or whether a student had graduated but was not employed.

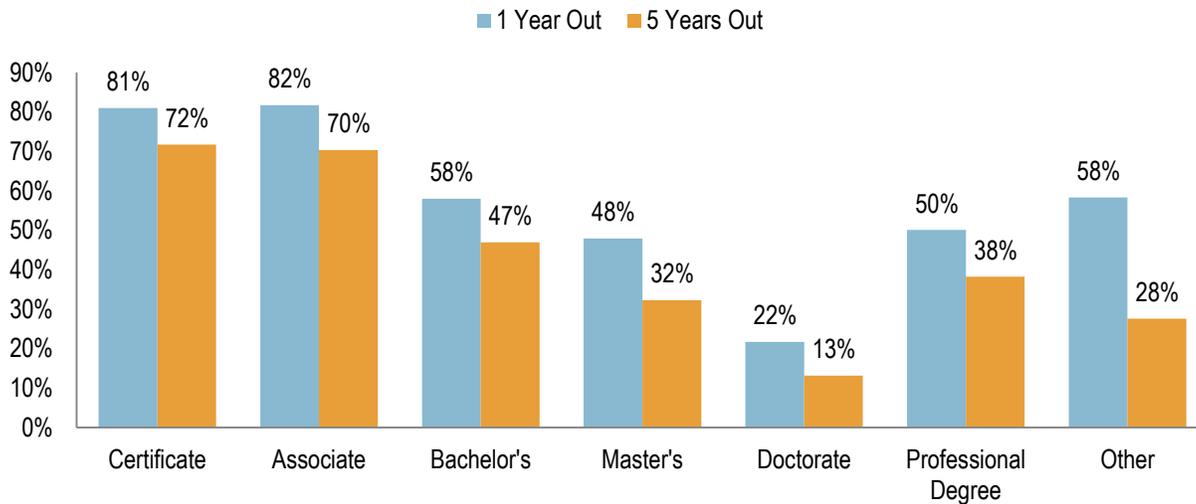
Of those who graduated over the 2000 to 2005 time frame, 220,874 individuals, or 59.1 percent, were in the state one year after graduation. The cohort graduates—those that had Indiana wage records both one year and five years after graduation—represent 43.1 percent of the 2000 to 2005 timeframe graduates, or 95,237 individuals. The cohort comprises 25.1 percent of the universe of graduates from 2000 to 2009.

Further analysis of remain-rates by degree for the 2000 to 2005 timeframe presents an interesting pattern—certificate and associate degree recipients are more likely to still be in the Indiana workforce one year later after graduation than any other degree—81 percent and 82 percent, respectively (see **Figure 2**). Recipients of bachelor’s degrees were the largest group of graduates in the state, but one year after graduation, only 58 percent were employed in Indiana. Four years after that, the state lost another 11 percent. Of the timeframe graduates, 22 percent of the undergraduate students at public universities originated from out of state. One can conclude, therefore, that these figures document a significant net loss of human capital from the state. With respect to the types of degrees, those with a doctorate degree were the least likely to still be in the state one year after graduation and five years after graduation a mere 13 percent remained in the state.<sup>4</sup>

<sup>3</sup> More information on the demographic profile of the three groups can be found under the ‘Demographics’ tab in the companion file.

<sup>4</sup> By way of contrast, over 30 percent of doctoral graduates from public universities in Tennessee remained in the state seven years after graduating (see “School-to-Work: Do Tennessee’s Higher Education Graduates Work in Tennessee? Part 1. State-level Labor Market and Earnings Trends” at [http://cber.utk.edu/THEC/thec\\_pt1.pdf](http://cber.utk.edu/THEC/thec_pt1.pdf)). More information about Indiana graduates can be found under the ‘Universe\_Retention’ and ‘Cohort\_degrees’ tabs of the companion file.

**Figure 2: Postsecondary Graduates Remain-Rates, 2000 to 2005 Timeframe Graduates**



Note: Other includes post-baccalaureate and post-master's certificates.

## Key Findings

Work outcomes were divided into two general categories: employment by industry and wages by industry. Industry employment rankings were based on the total number of cohort graduates employed in a particular industrial sector. Wage rankings were based on the industries that paid graduates the highest median (not average) wage.<sup>5</sup>

## Industry Employment

### Employment by Degree

**Table 3** presents the top 10 industries employing cohort graduates (by three-digit NAICS). Each industry has an icon to help a reader identify the ranking across degree types from column to column. Several industries are represented in all degree levels. Across most degree levels, there were two dominant industries: health care and social services (NAICS 621 to 624) as well as the educational services industry (NAICS 611). These three industry sectors employed 41.3 percent of the cohort graduates. Other industries that rounded out the top five in the number of graduates it employed were professional, scientific and technical services (6.5 percent), finance and insurance (4.3 percent) and administrative and support services (3.5 percent).

Graduate employment was heavily concentrated in educational services. This industry absorbed a majority of doctorate, master's and bachelor's degree. For associate and bachelor's degrees, the industry absorption profile flattened considerably after the top-ranked educational services. Associate and bachelor's degrees were not as concentrated in the top 10 industries as other credentials, as seen by the percent of total in the bottom row of **Table 3**, signaling a broad industry array of employment opportunities for these degrees in the state.

For those earning certificates, the health care industry clearly dominates, with nearly 68 percent employed in ambulatory health care services, hospitals or nursing and residential care facilities. The health sector's dominance is clear from **Table 3** and, if one removes the education services sector from consideration, is the undisputed destination for all degree holders in the state.<sup>6</sup>

<sup>5</sup> The Consumer Price Index – All Urban Consumers (CPI-U) was used to adjust wages for inflation to 2010 constant dollars. For the purpose of this study, the industry with the most earnings was selected as the “primary” industry for the individual. For a detailed look at all tables and graphs, references to the corresponding worksheets in the accompanying Excel workbook are included.

<sup>6</sup> More information can be found on the ‘Cohort IndRanks- Degree (1yr)’ tab of the companion file.

**Table 3: Top 10 Industries by Degree Counts, One Year after Graduation, 2000-2005**

*Sector Legend*



Rank	Certificate	Associate	Bachelor's	Master's	Doctorate <sup>§</sup>	Professional Degree
1	Nursing and Residential Care Facilities 	1,721 Hospitals 	4,942 Educational Services 	10,357 Educational Services 	5,883 Educational Services 	630 Professional, Scientific, and Technical Services 
2	Hospitals 	1,188 Ambulatory Health Care Services 	1,889 Hospitals 	4,021 Hospitals 	945 Chemical Manf. 	31 Hospitals 
3	Ambulatory Health Care Services 	1,140 Specialty Trade Contractors 	1,882 Professional, Scientific, and Technical Services 	3,784 Ambulatory Health Care Services 	672 Professional, Scientific, and Technical Services 	23 Ambulatory Health Care Services 
4	Administrative and Support Services 	216 Educational Services 	1,044 Administrative and Support Services 	2,234 Professional, Scientific, and Technical Services 	581 Ambulatory Health Care Services 	23 Executive, Legislative, and Other General Government Support 
5	Educational Services 	157 Professional, Scientific, and Technical Services 	918 Credit Intermediation and Related Activities 	2,138 Social Assistance 	362 Hospitals 	19 Health and Personal Care Stores 
6	Professional, Scientific, and Technical Services 	115 Administrative and Support Services 	870 Food Services and Drinking Places 	2,038 Chemical Manufacturing 	314 Social Assistance 	10 Educational Services 
7	Transportation Equipment Manf. 	114 Transportation Equipment Manf. 	646 Ambulatory Health Care Services 	1,751 Transportation Equipment Manf. 	241 Justice, Public Order, and Safety Activities 	98 Administrative and Support Services 
8	Primary Metal Manf. 	89 Executive, Legislative, and Other General Government Support 	626 Executive, Legislative, and Other General Government Support 	1,610 Machinery Manf. 	218 General Merchandise Stores 	41 Chemical Manf. 
9	Specialty Trade Contractors 	88 Credit Intermediation and Related Activities 	573 Social Assistance 	1,461 Nursing and Residential Care Facilities 	190 General Merchandise Stores 	39 Food Services and Drinking Places 
10	Food Services and Drinking Places 	82 Food Services and Drinking Places 	529 Insurance Carriers and Related Activities 	1,422 Executive, Legislative, and Other General Government Support 	189 Chemical Manf. 	34 Manufacturing 
<b>Subtotal</b>		4,910	13,919	30,816	9,595	2,155
<b>Cohort Total</b>		5,969	22,741	51,180	12,049	2,347
<b>Percent of Total</b>		<b>82.3%</b>	<b>61.2%</b>	<b>60.2%</b>	<b>79.6%</b>	<b>91.8%</b>

<sup>§</sup> Data was suppressed for industries with fewer than 10 observations.

Note: The "other degree" category, which includes post-baccalaureate and post-masters' degrees, had 127 individuals employed in NAICS 611 one year after graduation, representing 82.5 percent of all retained other degree recipients.

Compared to the industry distribution of degree holders one year after graduation, there was little change in the industry distribution four years later (the fifth year after graduation). Only four new industries emerged in the top 10, with food services and drinking places (NAICS 722) being replaced in certificate and associate degrees with social assistance and nursing and residential care facilities, respectively. Of bachelor's degree recipients, durable goods merchant wholesalers (NAICS 423) entered into the top 10. Administrative and support services emerged in the top 10 for master's degree recipients. The health

care and educational services industry still employed over 40 percent of the cohort graduates, experiencing only a 0.5 percent decline from the share employed by these industries one year after graduation. The professional, scientific and technical services industry experienced a slight uptick in the number of cohort graduates employed, the result of individuals moving to this industry over the four-year timeframe.<sup>7</sup>

### Industry Mobility Patterns

**Table 3** presents the most popular destination industries of the cohort immediately after graduating. The question then becomes: What happens to those graduates after five years?

**Table 4** shows the number of workers in each industrial sector both one and five years following graduation and by so doing, shows how graduates migrated from one sector to another.<sup>8</sup> The industry sectors with the greatest out-migration are retail trade, leisure and hospitality, and “other services,” which includes industries of repair and maintenance, personal and laundry services, religious, grant making, civic, professional and similar organizations, and private households.

**Table 4: Industry Mobility Patterns**

Industry Sector	One Year Out	Five Years Out	Net Gain/(Loss)	Percent Remaining <sup>§</sup>
Natural Resources and Mining	255	279	24	58.0%
Construction	3,932	3,775	(157)	74.9%
Manufacturing	10,003	10,634	631	76.7%
Retail Trade	9,554	8,577	(977)	55.0%
Transportation and Warehousing	1,274	1,334	60	57.2%
Utilities	411	614	203	83.7%
Information	2,111	2,048	(63)	54.7%
Financial Activities	6,391	6,363	(28)	62.5%
Professional and Business Services	10,323	10,815	492	55.4%
Educational Services	18,363	19,113	750	86.0%
Health Care and Social Assistance	22,824	22,396	(428)	83.3%
Leisure and Hospitality	4,095	3,120	(975)	43.5%
Other Services (not Public Administration)	1,715	1,613	(102)	44.5%
Public Administration	3,986	4,556	570	69.9%

<sup>§</sup> The percentage of workers in the industry one year from graduation that remained in the industry four years later. However, these workers may not be working for the same employer as one year out.

On the other end of the spectrum, the educational services and the health care and social assistance industrial sectors had the greatest percentage still working in those sectors, with education experiencing a significant number of in-migration workers. While professional and business services did not have a particularly high rate of workers remaining, they did have a significant number of in-migration workers, showing that this sector has a high degree of employee churn. Manufacturing—in contrast to trade, transportation and utilities—had a respectable numbers of workers remaining in the industrial sector and worker in-migration five years out.<sup>9</sup>

<sup>7</sup> More information can be found under the ‘Cohort Deg# (1&5 yr)’ tab as well as the ‘Cohort IndRanks-Degree (5yrs)’ tab.

<sup>8</sup> For the mobility analysis, the three-digit NAICS codes were condensed into 12 supersectors patterned after the U.S. Census Bureau NAICS Clarification memorandum No. 2: [www.census.gov/eos/www/naics/history/docs/cm\\_2.pdf](http://www.census.gov/eos/www/naics/history/docs/cm_2.pdf).

<sup>9</sup> More information on the mobility patterns can be found on the Cohort Mobility tab.

## Employment by Gender

Given that the typical graduate was female and that the greatest plurality of degrees were in health care, one could posit that the “typical graduate” was a woman working in the health care and educational services sectors. Of all cohort workers in these industries, women comprised 70 percent of those in educational services, 87.6 percent in hospitals, 86.4 percent in ambulatory health care services, and 89.4 percent in nursing and residential care facilities. Over 35 percent of women in the cohort were employed in the health care and social assistance industries and 22.5 percent were employed in educational services.

For men, the balance of degree holders across industries was not as skewed. Men were about evenly balanced between the top 10 industrial sectors hiring cohort graduates and the remaining sectors, 53 percent and 47 percent, respectively. In contrast, women were considerably more concentrated in the top 10 industrial sectors. Nearly three-quarters of female graduates were in the top 10. The educational services industry employed the largest percentage of male cohort graduates (14.4 percent), followed by professional, scientific and technical services at 8.4 percent. The industries that men dominated were in specialty trade contractors and transportation equipment manufacturing.

The general industry pattern one year after graduation held firm four years later. The top two industries for women were still educational services and hospitals. Men were still relatively concentrated in educational services and professional, scientific and technical services. That said, females were relatively less concentrated in the top two industries five years after graduation compared to just one year after earning their degree. The distribution of male cohort graduates was virtually unchanged.<sup>10</sup>

## Employment by Race and Ethnicity

Race did not appear to play a significant role in the industry distribution of graduates. Education services and health care (ambulatory and hospitals)—were consistently at the top of the list, irrespective of race. The industry for which black cohort graduates were relatively more concentrated in was administrative and support services. Whites were relatively more concentrated in professional, scientific and technical services, compared to black and Hispanic cohort graduates. The “unknown” race category concentration in professional, scientific and technical services was more akin to whites than black or Hispanic, but the other minority race category that includes Asian, Pacific Islander and American Indian was even more concentrated in this industry than whites. Five years after graduation, educational services and hospitals were still the top two industries. That said, there was some shuffling of rankings for the third largest concentration of each race/ethnicity category.<sup>11</sup>

## Industry Wages

### Wages by Degree

While the largest quantity of the cohort graduates worked in either the educational services or the health care services, these are not the leading industries in terms of median wages. As **Table 5** shows, one year after graduation, the manufacturing industries pay their workers relatively well, placing these industries in the top five for all degree levels. It is even more interesting to see that the top two industries for certificates and associate degrees (chemical manufacturing and primary metal manufacturing) compensate their workers more than those with bachelor’s degrees. Mining and utilities (NAICS 212 and 221, respectively) compensate their associate and bachelor’s degree recipients relatively well compared to the median wage for that degree.<sup>12</sup>

The presence of retail trade industries as the top three paying destinations for professional degrees was rather puzzling, at least initially, considering the typical high turnover rate and generally low wages in the retail sector. Upon investigation, however,

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<sup>10</sup> More detail about the top 10 industries by gender can be found in the ‘Cohort Sex# (1&5 yr)’ tab as well as the ‘Cohort IndRanks-Sex (1yr)’ and ‘Cohort IndRanks-Sex# (5 yrs)’ tabs.

<sup>11</sup> More information on this topic can be found under the ‘Cohort IndRanks –Race (1 yr)’, ‘Cohort IndRanks – Race (5 yr)’ and ‘Cohort Race# (1&5 yr)’ tabs.

<sup>12</sup> A more complete listing of the industry rankings by median wages can be found on the ‘Cohort Deg\$ (1&5 yr)’ tab. Another tab, ‘Cohort IndRanks-Degree (1yr)’ shows the ranking of all industries by degree for both quantity of employees and wages earned.

the research team discovered that 96 percent of the employees from the cohort had pharmaceutical degrees. As a result, pharmacists at retail locations elevated the wage values for that industry.

**Table 5: Top Five Median Wage Industries by Degree, One Year after Graduation**

*Sector Legend*



Rank	Certificate	Associate	Bachelor's	Master's	Doctorate	Professional Degree
1	Chemical Manf. 	Utilities 	Chemical Manf. 	Wholesale Electronic Markets and Agents and Brokers 	Chemical Manf. 	Food and Beverage Stores 
2	Primary Metal Manf. 	Primary Metal Manf. 	Mining (except Oil and Gas) 	Miscellaneous Manf. 	Professional, Scientific, and Technical Services 	General Merchandise Stores 
3	Nonmetallic Mineral Product Manf. 	Specialty Trade Contractors 	Transportation Equipment Manf. 	Transportation Equipment Manf. 	Social Assistance 	Health and Personal Care Stores 
4	Construction of Buildings 	Mining (except Oil and Gas) 	Primary Metal Manf. 	Nonmetallic Mineral Product Manf. 	Educational Services 	Ambulatory Health Care Services 
5	Insurance Carriers and Related Activities 	Transportation Equipment Manf. 	Machinery Manf. 	Machinery Manf. 	Ambulatory Health Care Services 	Chemical Manf. 
<b>Median</b>	<b>\$30,338</b>	<b>\$34,895</b>	<b>\$33,286</b>	<b>\$48,519</b>	<b>\$60,641</b>	<b>\$62,032</b>

Note: Wages reflect median for degree and industry in 2010 dollars.

Five years after graduation finds the mix of top five industries by wages similar to the one-year out profile, with some shuffling in the rankings. Most of those working in the industries in **Table 6** experienced an increase in wages. The only exceptions were nonmetallic mineral product manufacturing (NAICS 327) in the certificates category and wholesale electronic markets and agents and brokers (NAICS 425) in the master's degree category. A couple of factors help explain these counterintuitive results: First, these exceptions comprise less than 20 people and, with such a small population, a handful of people can skew the results. Second, these small industry/degree subsets of the cohort experienced a great deal of churn in five years. Those who were in both subsets of one-year out and five-years out were not earning less five years after graduation. There were new individuals in the five-years out subset that pulled down the median. In other words, the new blood that entered the industry/degree subset after the first year distorted the results five years out. Overall, those with bachelor's degrees and above increased their median wages more quickly than those with certificates or associate degrees.<sup>13</sup>

<sup>13</sup> A more complete listing of the industry rankings by median wages can be found on the 'Cohort Deg\$ (1&5 yrs)' tab. Another tab, 'Cohort IndRanks-Degree (5yrs)' shows the ranking of all industries by degree for both quantity of employees and wages earned.

**Table 6: Top Five Median Wage Industries by Degree, Five Years after Graduation**

*Sector Legend*



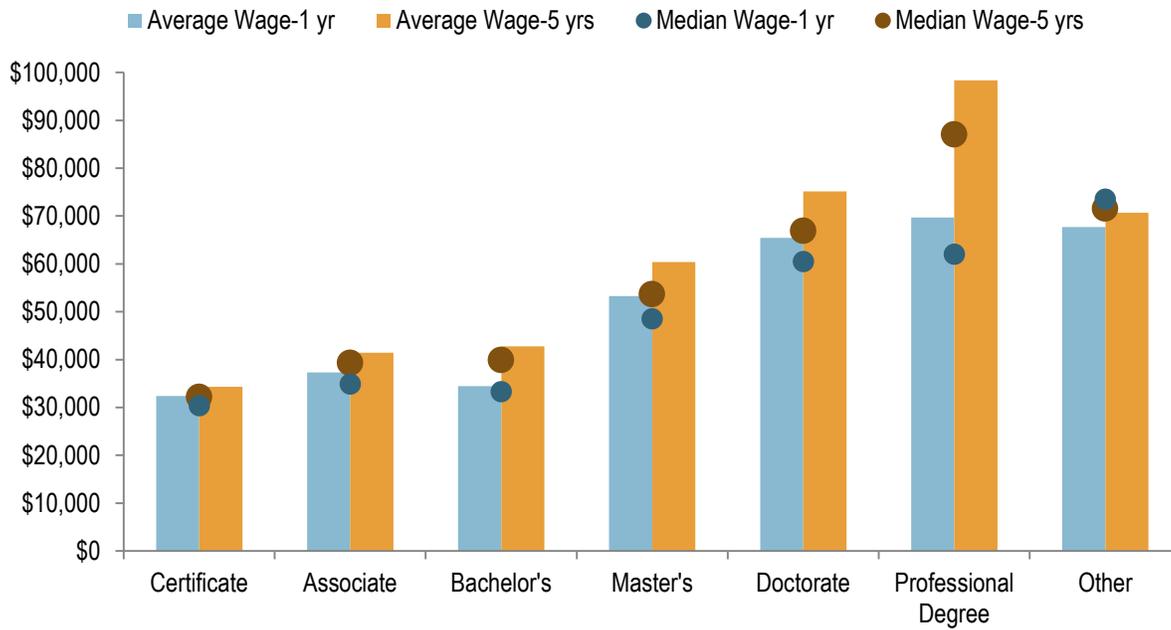
Rank	Certificate	Associate	Bachelor's	Master's	Doctorate	Professional Degree
1	Chemical Manf.	Utilities	Petroleum and Coal Products Manf.	Machinery Manf.	Chemical Manf.	Ambulatory Health Care Services
2	Primary Metal Manf.	Mining (except Oil and Gas)	Chemical Manf.	Heavy and Civil Engineering Construction	Professional, Scientific, and Technical Services	General Merchandise Stores
3	Utilities	Primary Metal Manf.	Primary Metal Manf.	Electrical Equipment, Appliance, and Component Manf.	Ambulatory Health Care Services	Food and Beverage Stores
4	Construction of Buildings	Petroleum and Coal Products Manf.	Water Transportation	Wholesale Electronic Markets and Agents and Brokers	Educational Services	Chemical Manf.
5	Nonmetallic Mineral Product Manf.	Specialty Trade Contractors	Utilities	Chemical Manf.	Hospitals	Health and Personal Care Stores
<b>Median</b>	<b>\$32,177</b>	<b>\$39,256</b>	<b>\$39,858</b>	<b>\$53,627</b>	<b>\$66,834</b>	<b>\$87,000</b>

Note: Wages reflect median for degree and industry in 2010 dollars.

**Earnings by Degree**

**Figure 3** presents the average and median real annual wages of the cohort for both one year and five years after cohort members earned their degrees. In the short run (one year out), associate degree holders earn slightly more than bachelor's degree recipients, \$37,229 versus \$34,474, respectively. Similarly, those with a certificate were earning only \$2,056 less than those with bachelor's degrees. Over time, however, bachelor's degree recipients have a stronger average wage growth (24 percent) than either associate degrees (11 percent) or certificate holders (6 percent). In fact, only professional degree graduates have a higher rate of wage growth than those with bachelor's degrees. Also, professional degree graduates have a relatively large difference between their median and average wage, signaling the extreme earnings of a handful of those degree holders that skews the category's average earnings. The differences between median and average annual wages are relatively minor for all other degree types.

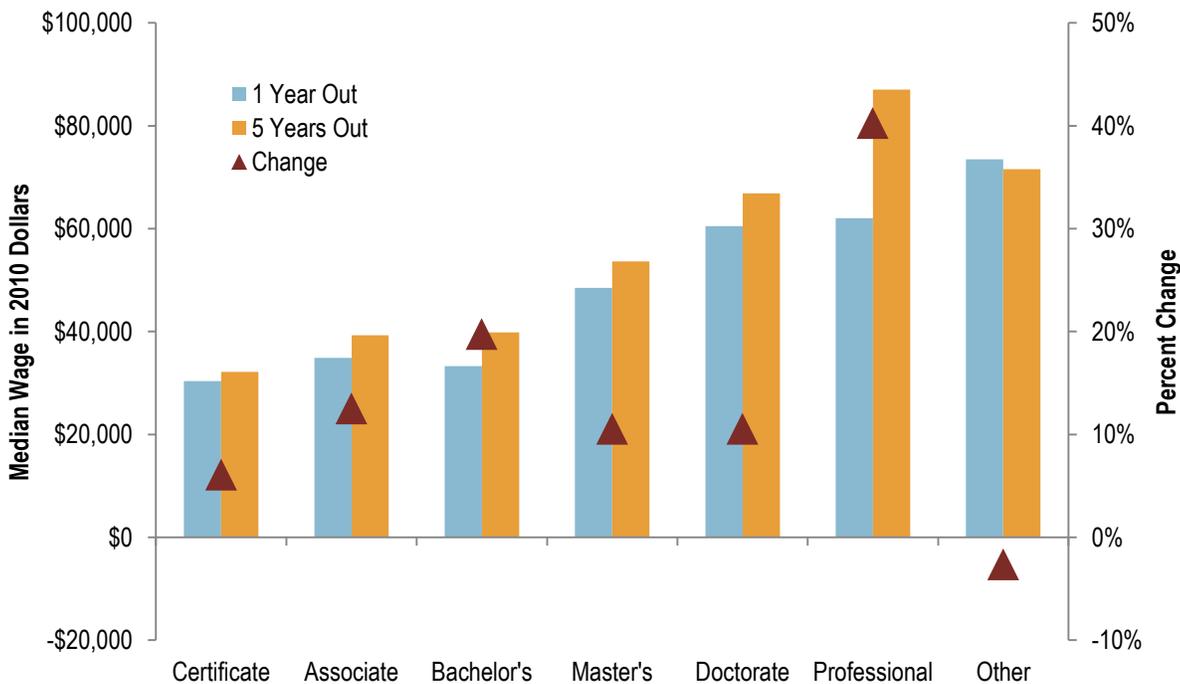
**Figure 3: Average and Median Wage of Cohort, One and Five Years Out**



Note: Other includes post-baccalaureate and post-master's certificates. Professional degree refers to first professional degree.

**Figure 4** graphically portrays the difference in median annual wages from one and five years after graduation by degree. Most degrees had an annual increase in wages from one to five years after graduation, ranging between almost \$2,000 and just above \$6,500. The exception was professional degrees. Their median wage growth was over twice that of bachelor's degree holders and almost four times the wage increases for master's and doctoral degree holders in the cohort.<sup>14</sup>

**Figure 4: Comparison of Median Wages by Degree, One and Five Years Out**



<sup>14</sup> More information can be found under the 'Wages 1 yr & 5 yrs' tab.

## Wages by Gender

Manufacturing paid the highest wages for both men and women one year after graduation. Seven out of the top 10 highest paying industries were in manufacturing for both males and females. Primary metal manufacturing and chemical manufacturing were in the top three wage industries for both men and women. As noted earlier, there are differences in earnings between males and females, even in the same industry. For example, in chemical manufacturing, the male median wage was \$63,874 whereas the female median was \$61,060. The wage gap was even larger in primary metal manufacturing, \$64,338 for men versus \$48,027 for women. The reason for this large gap could not be directly pinpointed with the available data. However, the assumption of the wage differential being due to differences in occupations held by gender may be the culprit. The data did show that of the men and women employed in primary metal manufacturing (NAICS 331), 70 percent of men had either a business (35 percent) or engineering and architecture (34 percent) degree whereas women predominantly had business degrees (58 percent). Typically, engineering degree recipients earn more than business degree recipients immediately following graduation. This could explain the difference one year after graduation. While the educational and health care services industries are the clear leaders in terms of the number of degree holding women employed, this was not the case in terms of wages. Only the hospital industry (NAICS 622) was in the top 10 industries for women's median wages (\$42,187).

Manufacturing industries still dominated the top 10 list of industry wages for both men and women five years after graduation, but other industries climbed onto the list. Chemical manufacturing and petroleum and coal product manufacturing recorded the highest wages for both men and women, relegating primary metal manufacturing to third place.<sup>15</sup> While the industry wage gap between the sexes increased for most industries over the four years, there were notable exceptions. For example, the median wage for women in utilities increased by \$10,700 in four years, but for men, median wages increased by \$3,500. Women also edged out men in wage gains in primary metal manufacturing.<sup>16</sup>

## Earnings by Gender and Degree

Generally, men had higher wages than women at all degree levels. The top three spreads between male and female one year after graduation occur in the "other degrees" category that includes post-baccalaureate and post-master's certificates. This wage spread of \$25,311 for (post-degree) certificates bested the male/female differences for master's degrees and (pre-baccalaureate) certificates of \$16,674 and \$14,019, respectively. Professional degrees had the smallest difference, \$403, which is less than a 1 percent differential between the sexes in the first year.

Four years later, however, the earnings difference widens, with professional degrees having the largest gap between men and women. What had been a difference of only \$403 one year out became a nearly \$17,000 difference in just four years. Granted, one cannot look solely at the attained degree by gender alone. There are other considerations, such as the type of occupation or the number of hours worked to gain a more accurate picture of the wage differences.<sup>17</sup>

## Wages by Race/Ethnicity

Like the work outcomes of men and women, workers in the manufacturing industries were also the leading wage earners when categorized by race and ethnic background. In the first year after graduation, chemical manufacturing was the top wage industry for all racial and ethnic categories, with the exception of those who did not designate their race or ethnicity. For Caucasian, black/African American and Hispanic graduates, primary metal manufacturing provided the second highest wage. Typically, manufacturing industries dominated the top 10 wage list, except for blacks/African Americans. This racial category had a broader sampling of industries in the top 10 wage list by race, including the merchant wholesalers, hospitals and telecommunications industries. All the other racial categories had either six or seven of the top industry wages involved in manufacturing.

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<sup>15</sup> With the exception of the four men working in the pipeline transportation industry that averaged industry wages of \$84,820 for those four individuals in the cohort.

<sup>16</sup> More information about the top 10 industry wages by gender can be found under the 'Cohort Sex\$ (1&5 yr)' tab as well as the 'Cohort IndRank Sex (1yr)' and 'Cohort IndRank Sex (5yrs)' tabs.

<sup>17</sup> For more detailed data on this topic, view the 'Avg Wages by Gender' and 'Median Wages by Gender' tabs.

At the five-year mark, the manufacturing sector was still the top industry wage for most racial/ethnic categories. Similar to the rankings one year after graduation, chemical manufacturing remained as either the top or second-highest industry wage for all categories. Similar to the findings for both men and women, the industry wages for petroleum and coal products manufacturing pushed to the top three for Caucasians and blacks/African Americans. Across the racial/ethnic spectrum, median wages in most industries rose over the one- to five-year timeframe. The largest bump in wages occurred in the petroleum and coal product manufacturing. The median wage for Caucasians in this industry increased by \$27,400 in four years.<sup>18</sup>

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<sup>18</sup> More information about the top ten industry wages by race for both one and five years out can be found at the 'Cohort Race\$ (1&5 yr)' tab as well as the 'Cohort IndRank Race (1 yr)' and 'Cohort IndRank Race (5yrs)' tabs.

# Conclusions

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The IWIS database can provide a wealth of information about Indiana's postsecondary students, graduates and workforce. Using this rich dataset, researchers identified some employment trends for Hoosier postsecondary graduates.

The education sector not only produces graduates, it also hires the most graduates. Following education, the array of health care industries absorbed the greatest number of degree holders educated at Indiana's public higher education institutions.

A majority of the state's sub-baccalaureate graduates remain in the state. Initially these graduates earn wages nearly equal to or higher than bachelor's degree recipients. Over time, however, the bachelor's degree recipient's wages grow more rapidly than sub-baccalaureate graduates.

The data also show that women tend to remain in the state to work; six out of every 10 female graduates remain in the state, while only four out of 10 male graduates remain. A majority of those women were employed in health care and social services and educational services.

The industries with the higher wages for the cohort of Indiana graduates from 2000 to 2005 tended to be in manufacturing, particularly in chemical manufacturing. Men tended to earn more than women across industries and across degree types, but these wage gaps may reflect occupational differences that were not within the scope of this study. Over the five-year time frame, there was a subtle shift in the wage profile of the cohort graduates, from dominance in manufacturing to a wider array of industries. As the economy transforms and new industries emerge and deepen their roots, one may expect to see this subtle shift from 2000 to 2005 become more pronounced in the coming decade.