

Indiana Graduates and Brain Drain

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The Clash's hit song "Should I Stay or Should I Go?" states the dilemma well. Should a graduate of an Indiana institution of higher learning stay in the state to work and put down roots or go elsewhere to seek his or her possible fortunes?

Just how many graduates of Indiana public colleges stay or go? In what proportions? Graduates are not a homogeneous group. A graduate's major may have an influence on their decision is to stay in the state or not. The following analysis uses a relatively new database that can show how many graduates from a public college in the state remain to work in Indiana or not. (Data for private institutions are not currently available.)

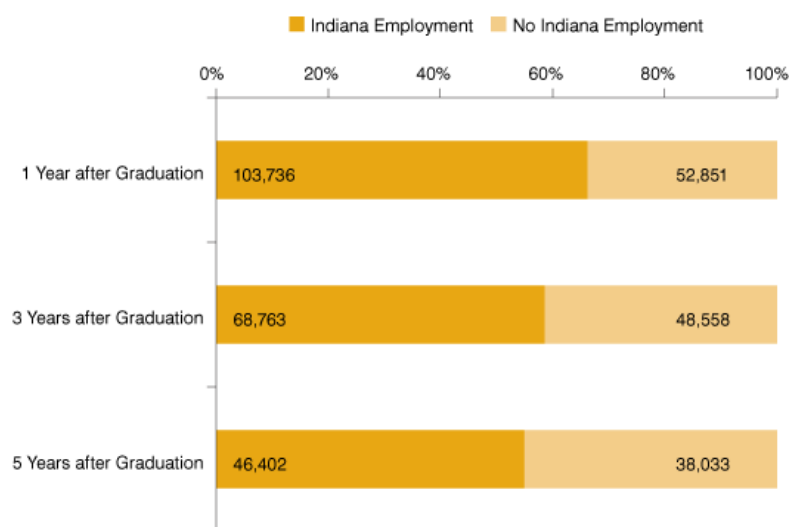
The data are from the Indiana Workforce Intelligence System (IWIS). By aggregating student-record level data, we can determine how many recent bachelor's degree graduates from Indiana's public institutions remained to work in the years after graduation. The sample included 156,587 bachelor's degree recipients who graduated between 2002 and 2011.

The research team created three groups based on how long ago a person graduated. Group 1 consisted of graduates one year after graduation. Groups 3 and 5 correspond to graduates three and five years after graduation, respectively.

Brain Drain Increases over Time

Figure 1 shows that the tendency of bachelor's degree graduates to stay and work in Indiana after graduation declines over time. The probability of Indiana employment was highest one year after graduation (66 percent), with the remain-rate falling to 59 percent after three years and 55 percent after five years. Despite this downward trend, *more than half* of Indiana's public institution bachelor's degree recipients were still employed in the state five years after graduation.

Figure 1: Probability of Working in Indiana after Graduation by Group

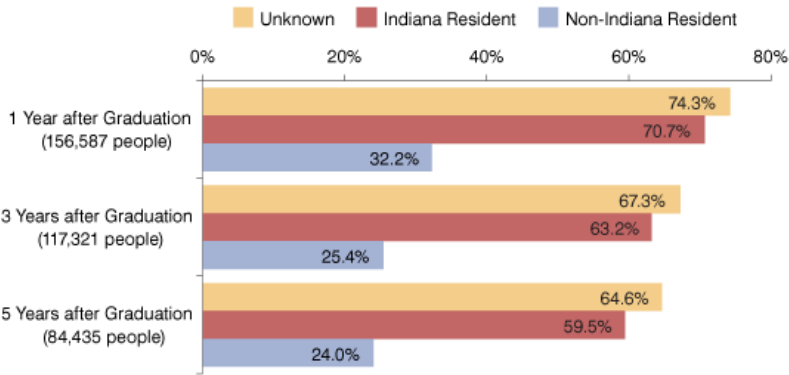


Source: IBRC, using IWIS data

As **Figure 2** shows, the remain-rates for Indiana residents were more than twice as high as for those who were non-residents at the time of attending college. The relatively small group of graduates with unknown residency status had higher remain-rates (by 4 percent or more) than Indiana residents in each group, suggesting that many of those with unknown residency status were likely

Indiana residents.

Figure 2: Remain-Rates by Residency Status



Source: IBRC, using IWIS data

Differences by Academic Major

Of the 41 possible academic majors (based on two-digit CIP codes),¹ Group 1 contained graduates in 32. However, nearly three out of four graduates, regardless of the group, graduated in one of 10 majors: business, education, health, communication and journalism, liberal arts and sciences, social sciences, visual and performing arts, engineering technologies, psychology, and engineering.

Table 1 shows the “top 10” concentrations of graduates per academic major for each group. Five of those most popular majors (health, education, liberal arts and sciences, engineering technologies, and business) were also in the top 10 in terms of remain-rates.

Table 1: Graduate Distribution by Academic Major and Group

	Group 1		Group 3		Group 5	
Academic Major*	Number of Graduates	Percent	Number of Graduates	Percent	Number of Graduates	Percent
Business	28,552	18.2	22,126	18.9	16,251	19.3
Education	17,700	11.3	13,474	11.5	9,559	11.3
Health	12,925	8.3	8,917	7.6	5,854	6.9
Communication and Journalism	11,996	7.7	9,269	7.9	6,881	8.2
Liberal Arts and Sciences	9,996	6.4	7,348	6.3	5,244	6.2
Social Sciences	8,135	5.2	5,956	5.1	4,182	5.0
Visual and Performing Arts	6,752	4.3	5,052	4.3	3,641	4.3
Engineering Technologies	6,552	4.2	5,037	4.3	3,629	4.3
Psychology	6,219	4.0	4,656	4.0	3,396	4.0
Engineering	6,013	3.8	4,410	3.8	3,218	3.8
Subtotal	114,840	73.3	86,245	73.5	61,855	73.3
Total	156,587	100	117,321	100	84,435	100

*Majors shown in bold also had one of the 10 highest remain-rates.

Source: Integrated Postsecondary Education Data System (IPEDS)

Overall, graduates with a legal professions degree had the highest remain-rates (over 70 percent) in each group.

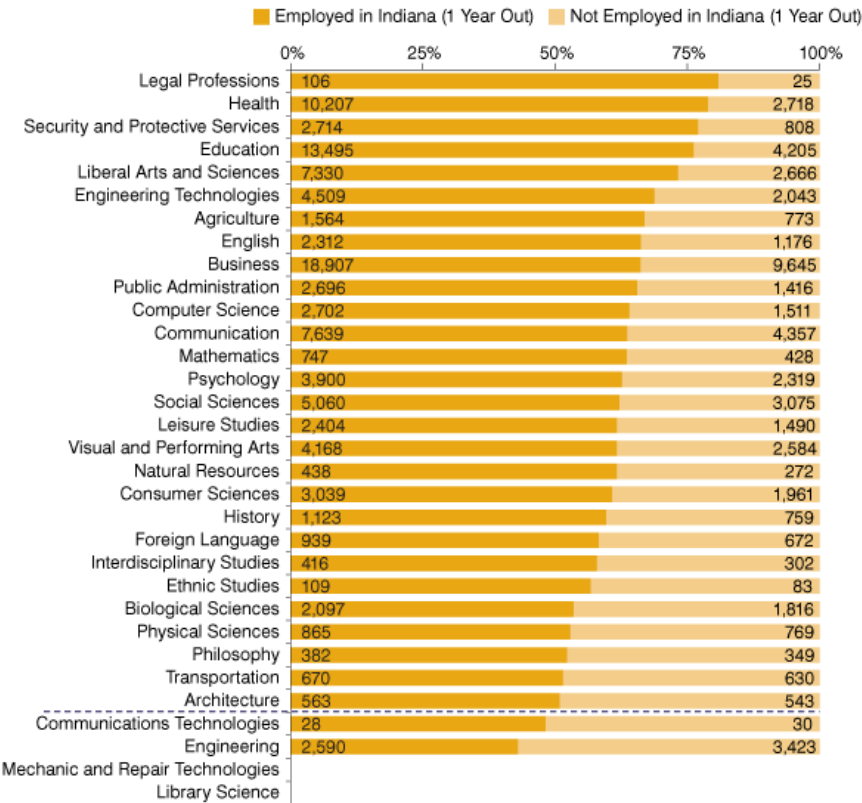
The majors with the lowest remain-rates were also consistent across groups. Graduates with degrees in transportation, philosophy or engineering, for example, were among the least likely to stay and work in Indiana.

The following figures illustrate the effect of program of study on graduates staying and working in the state.

One year out, graduates in 28 different majors had over a 50 percent chance (above the dashed line) of still working in Indiana. Engineering and communications technology graduates were the only ones fresh out of college who more likely not to be working

in the state (see **Figure 3**).

Figure 3: Probability of Working in Indiana One Year after Graduation by Major (Group 1)

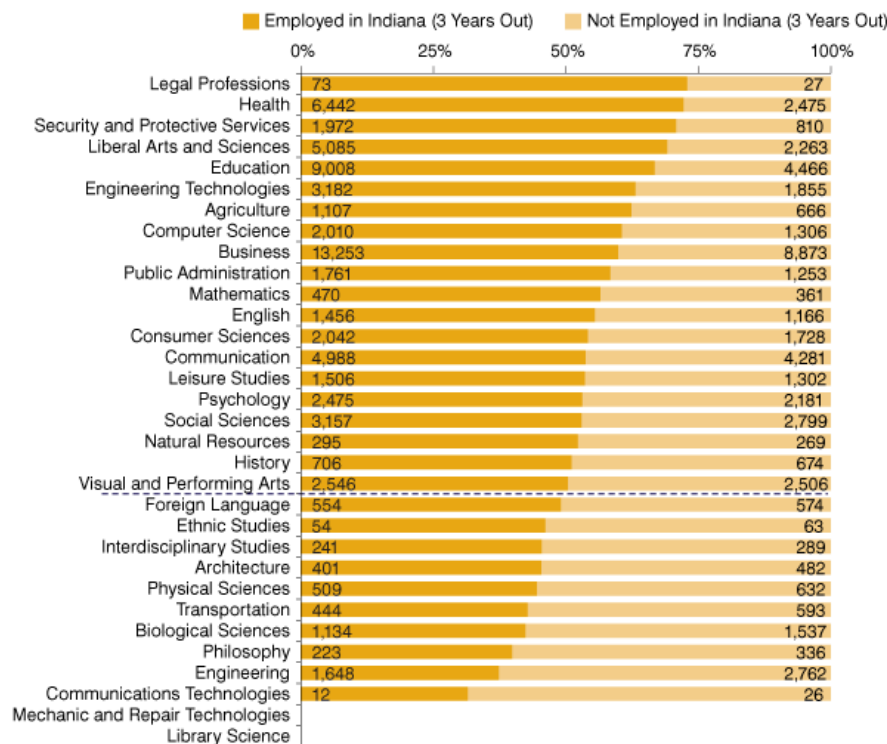


Note: Majors with no data have either too few, or no, observations to display.

Source: IBRC, using IWIS data

Three years out (Group 3), average remain-rates below 50 percent now applied to graduates in 10 majors instead of just two (see below the dashed line of **Figure 4**). In addition to communication technology and engineering, graduates in foreign languages, ethnic studies, interdisciplinary studies, architecture, physical sciences, transportation, biology and philosophy were also more likely now to be employed outside of Indiana.

Figure 4: Probability of Working in Indiana Three Years after Graduation by Major (Group 3)

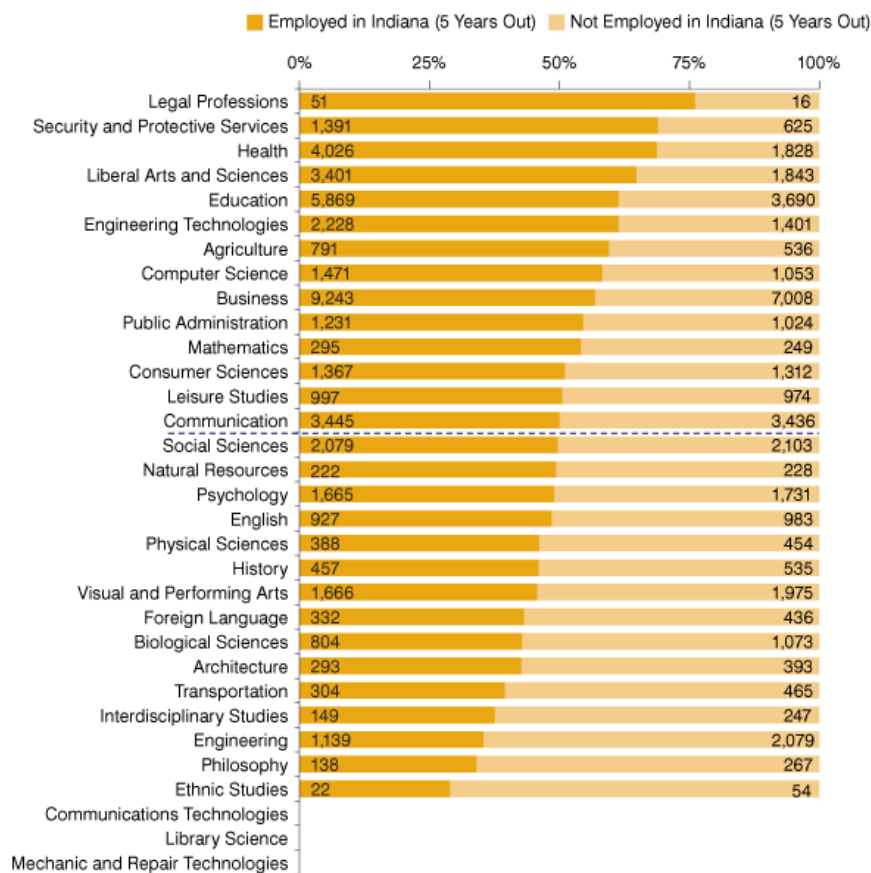


Note: Majors with no data have either too few, or no, observations to display.

Source: IBRC, using IWIS data

Five years out (Group 5), the number of different majors where graduates were more likely to be working in state than out of state fell to 14 (see **Figure 5** above the dashed line)—a 50 percent reduction compared to Group 1.

Figure 5: Probability of Working in Indiana Five Years after Graduation by Major (Group 5)



Note: Majors with no data have either too few, or no, observations to display.

The majors of graduates with remain-rates greater than 50 percent included legal professions, security and protective services, health, liberal arts and sciences, education, engineering technologies, agriculture, computer and information sciences, business, public administration, mathematics, family and consumer sciences, leisure studies, and communication.

Conclusion

One year after graduation, 66 percent of graduates from public institutions remained and were working in the state. Over time, however, the remain-rate falls to 59 percent after three years and, after five years, 55 percent of graduates were working in the state. Does this imply that Indiana suffers from a brain drain?

Or does it imply that Indiana suffers from an opportunity deficit? These are huge questions that can't really be addressed in a short, descriptive article informed by secondary data. Secondary data can't answer the why questions, but one may speculate that the reason Indiana engineering graduates have a relatively low remain-rate is a lack of employment opportunities at competitive compensation in the state.

The low remain-rates for engineering may impinge on Indiana's ability to compete, innovate and sustain leadership in high-tech manufacturing. Policy makers may also begin asking the why questions as to whether and why other STEM-related disciplines move away at above-average rates over time.

Majors with generally higher remain-rates tend to be graduates that find employment that is driven by population, for example, health care, education, and security and protective services. (It would be interesting to see how many of the business majors stay in the state and work in retail.) Other majors—English or history, for example—may move away over time at greater than average rates as they transition from just-out-of-college-stop-gap employment in the state to more permanent career opportunities out of state.

This analysis presented the nuances associated with the question of brain drain in Indiana. Remain-rates depend on a graduate's major and the length of time since graduation. Over time, the IWIS database will also be able to answer the question about whether those graduates that left the state soon after graduation returned. Let us hope that answer is yes. The state could use the human capital.

Background Information about the Groups

While Group 1 included all graduates between 2002 and 2011, the joint constraints imposed by the most recent employment data (2012) and larger post-graduation time horizons restricted the number of graduates available for the last two Groups: Group 3 had to be restricted to graduates between 2002 and 2009; similarly, Group 5 included graduates between 2002 and 2007.

Group 1 had 156,587 graduates. More than 86 percent (135,350) of the graduates were Indiana residents, compared to 11.7 percent (18,273) non-residents (see **Table 2**).

Table 2: Indiana Residency Status by Group

Indiana Residency	Group 1	Group 3	Group 5
Indiana Resident	135,350	99,790	70,357
Non-Indiana Resident	18,273	14,604	11,211
Unknown	2,964	2,927	2,867
Total	156,587	117,321	84,435

Source: IBRC, using IWIS data

Nearly 76 percent of the graduates in Group 1 attended either Indiana University (68,141; 43.5 percent) or Purdue University (50,740; 32.4 percent). These figures include each institution's main and regional campuses. The remaining institutional distribution of graduates was Ball State University (20,217: 12.9 percent); Indiana State University (9,400: 6 percent); University of Southern Indiana (7,872: 5 percent) and Vincennes University (217: 0.1 percent).

Group 3 contained 117,321 graduates and shared similar attributes with Group 1. For example, more than 85 percent (99,790) of the graduates were Indiana residents. The relative concentration of graduates from each institution also mirrored Group 1, with Indiana University having the largest (50,349; 42.9 percent) and Vincennes University (92; 0.1 percent) having the smallest.

Group 5 included 84,435 students who graduated between 2002 and 2007. The percentage of Indiana residents (83.3 percent) and non-residents (13.3 percent) decreased slightly, compared to the first two Groups. Group 5 graduates also predominantly attended Indiana (36,108: 42.8 percent) and Purdue (27,543: 32.6 percent) universities. The relative distribution of the remaining graduates was similar to Groups 1 and 3.

Notes

1. For more information on the Classification of Instructional Program (CIP) structure, please visit the NCES website at <http://nces.ed.gov/ipeds/cipcode/browse.aspx?y=55>.

Who's Hiring?

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How can we measure labor supply and demand? There are growing numbers of non-governmental sources for informative labor market information and economic analysis. This article examines some of the key hiring demand indicators used by researchers and economic developers. The Indiana Department of Workforce Development (DWD) analyzes these data alongside its own Indiana Career Connect and Indiana Workforce Intelligence System (IWIS) data to better understand hiring demand.

Hiring Demand Indicators: Help Wanted OnLine and Wanted Analytics

Hiring demand, sometimes referred to as labor demand, has two parallel sources which are used to track and provide information regarding job vacancy postings all over the United States. The Help-Wanted OnLine (HWOL)[®] Data Series from The Conference Board¹ is a job market vacancy listing that provides data collected from online job board sources throughout the nation. This series measures the number of “point in time” new, online job orders and jobs reposted from the prior month for over 16,000 job boards, corporate boards and smaller Internet sites that serve specialty job markets. These sources report middle of the month figures, to coincide with labor force estimates as reported by the U.S. Department of Labor.

WANTED Analytics[™] began collecting detailed hiring demand data in June 2005 and is the exclusive data provider for the Help-Wanted OnLine Data Series, the monthly economic indicator of hiring demand in the United States. WANTED Analytics also uses web spidering technology to cull “real time” vacancy information from job boards across the country.

While online job postings only capture a small portion of the total economy and not every posting will result in a job vacancy filled, they can nevertheless be a leading indicator of future job growth in a given geographic area.

Comparison of the U.S., Indiana and Midwest

September 2013 help wanted ads in the United States were up by 209,700 (4 percent) over August 2013. Nationally, this is an increase of 304,305 ads (6 percent) since September 2012. The largest September gain was for food service workers, up 45,000. The number of ads for management positions also increased by 24,700 and transportation worker ads were up by 20,800. Hiring demand in the Midwest increased by 48,200 in September from August. **Table 1** shows the data for select Midwestern states.

Table 1: Help Wanted Ads in Select Midwestern States, August 2013 to September 2013

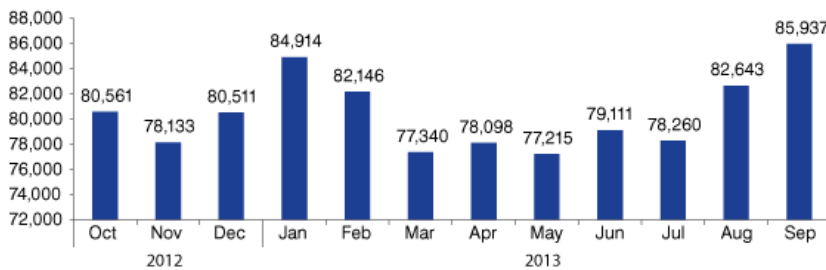
State	Change in Number of Ads	September Total Ads	Percent Change in Ads	Percent Change in Total Employment
Nebraska	4,200	44,100	10.5%	0.4%
Kansas	3,100	46,700	7.1%	0.2%
Minnesota	5,900	122,900	5.0%	0.2%
Iowa	2,700	55,300	5.1%	0.2%
Missouri	3,600	85,600	4.4%	0.1%
Indiana	3,300	85,900	4.0%	0.1%
Illinois	7,500	204,500	3.8%	0.1%
Michigan	4,800	141,900	3.5%	0.1%
Ohio	3,400	197,500	1.8%	0.1%
Wisconsin	800	102,400	0.8%	0.0%

Note: Data are seasonally adjusted.

Source: The Conference Board and Help Wanted OnLine

Indiana's online advertised vacancies rose 3,300 (4.0 percent) in September to an all-time series high of 85,937, seasonally adjusted (see **Figure 1**). This is an increase of 5,500 (7.0 percent) jobs posted in Indiana from September of last year, and slightly more than the national gains in advertised job ads. Optimistically we can hope this is a sign that Indiana employers are becoming less hesitant to fill new positions.

Figure 1: Indiana Monthly Online Job Openings, October 2012 to September 2013

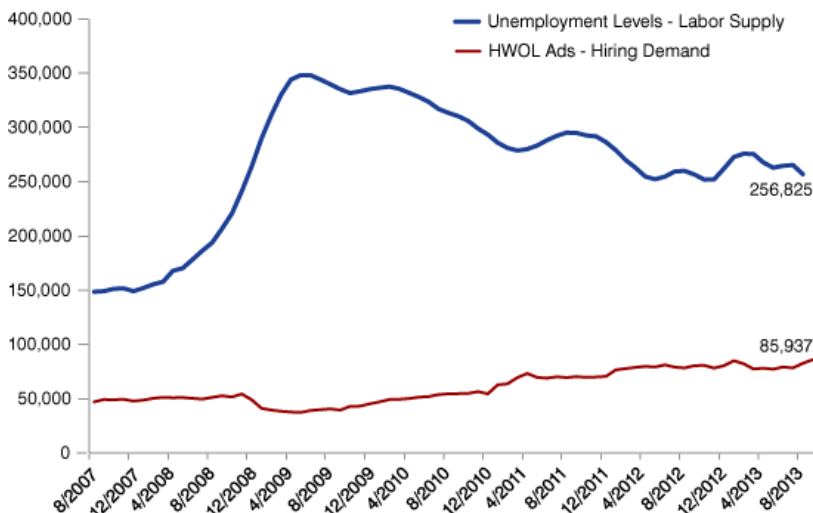


Note: Data are seasonally adjusted.

Source: The Conference Board and Help Wanted OnLine

Figure 2 shows Indiana in August 2013 with 174,182 more unemployed than the number of advertised vacancies.² This is down from 309,034 at the end of the recession in June 2009. Online ads for Indiana have increased by 45,205 or almost 110 percent during the same time period. The supply and demand rate in August stood at 3.1 unemployed Hoosiers for every posted vacancy. This has declined from a peak of 9.2 unemployed for every posted ad in the spring of 2009. The gap between hiring demand and labor supply as measured by these two sources began to increase in early 2008. This could have been an early indicator of the job losses ahead.

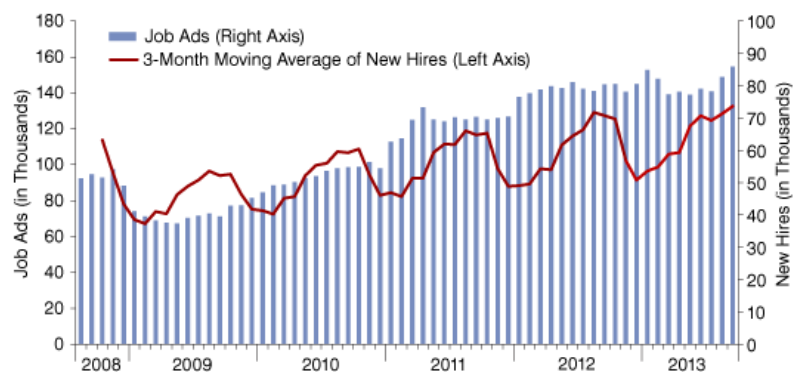
Figure 2: Indiana Labor Supply vs. Demand, August 2007 to August 2013



Source: The Conference Board, Help Wanted OnLine and the U.S. Bureau of Labor Statistics

Examining the job ads against a subset of new hires as reported to DWD also shows a consistent if non-surprising trend. The new hires charted as a rolling and lagged three-month average, follow the trend of job postings (see **Figure 3**). We can, therefore, make some general assumptions about job ads and future hiring. Throughout the recovery the trend has been positive and continues to climb.

Figure 3: Indiana Job Ads and New Hires, August 2008 to September 2013



Source: The Conference Board, Help Wanted OnLine; Indiana Department of Workforce Development and Indiana Workforce Intelligence System

Another promising figure is that the majority (58.7 percent) of jobs posted in September of 2013 were for full-time positions (see **Table 2**).

Table 2: Job Type Distribution, September 2013

Job Type	Volume	Percent of Total
Full-Time	50,457	58.7%
Part-Time	17,456	20.3%
Contract	8,260	9.6%
Internship	481	0.6%
Unclassified	9,283	10.8%
Total	85,937	100.0%

Source: The Conference Board, Help Wanted OnLine

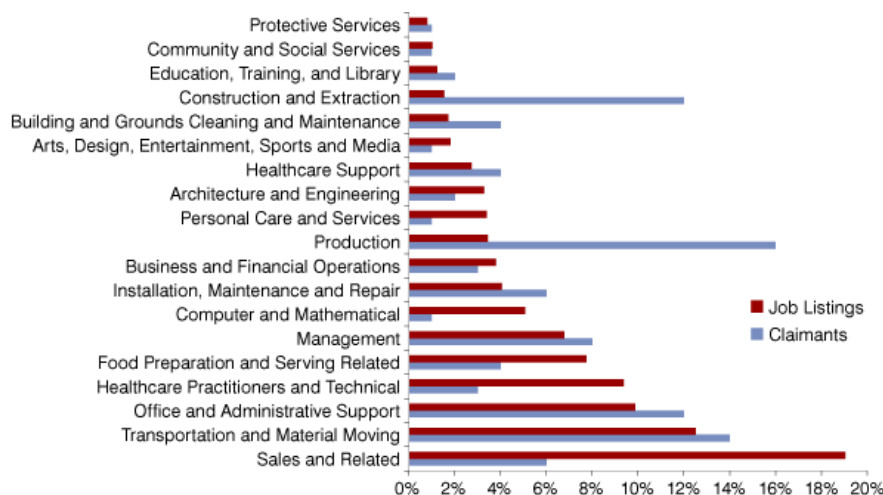
Industry and Occupation

Industries with the highest volume of ads in September were retail trade; health care and social sciences; and administrative and support and waste management and remediation services (which includes temporary help agencies).

Sales and related occupations had the most total ads by major occupation group, followed by transportation and material moving occupations and healthcare practitioners and technical occupations. The last two occupation groups are also growth areas according to long-term employment projections by DWD.

Analysis of the Indiana Career Connect database reveals some of the gap between supply and demand. The Indiana Career Connect database is merely a subset of the possible labor pool (namely the unemployed population receiving unemployment benefits). However, **Figure 4** indicates that there are far fewer trained and experienced unemployed workers available than in demand for personal care and service; computer and mathematical; healthcare practitioners and technical; as well as for sales and related occupations. Some key detailed occupations within these groups include engineers, database administrators, health diagnosing and treating practitioners, and services sales representatives. This does not represent the full available labor pool for Indiana, but it may give workforce professionals some indications of where the unemployed population may need additional training to transition to new employment.

Figure 4: Percent of Job Listings vs. Unemployed Claimants by Occupation Group, September 2013



Source: The Conference Board, Help Wanted OnLine; Indiana Department of Workforce Development, Indiana Career Connect

Occupational Coding to Better Determine Labor Supply

The Research and Analysis Division at DWD continues to seek new data to better understand Indiana's available labor pool. One critical data element that could benefit researchers is more thorough reporting of Standard Occupational Classification (SOC) codes.³ Having the SOC code for the unemployed claimant population helps us collect the occupational information shown in **Figure 4**. Yet we are missing this detail for most employer-reported data. These codes would allow for researchers to better analyze the skills and job functions of the workforce. Inclusion of the occupation codes within the IWIS longitudinal database already constructed, would allow researchers the ability to glean a better understanding of the skills gap and of the labor market in general. Indiana could then make more focused improvements in our educational systems and do a better job in designing training and curriculum to meet employer demand.

Notes

1. Learn more about The Conference Board at www.conference-board.org/about/index.cfm?id=1980.
2. September 2013 unemployment data for Indiana were not available due to the government shutdown.
3. More information on SOC codes can be found at www.onetonline.org/.

References

- The Conference Board, Help Wanted OnLine® (www.conferenceboard.org) and WANTED Analytics™ (www.wantedanalytics.com)
- U.S. Bureau of Labor Statistics (www.bls.gov/)
- Indiana Department of Workforce Development, Indiana Career Connect (www.indianacareerconnect.com)
- Indiana Workforce Intelligence System (www.iwis.iupui.edu/)
- Indiana Department of Workforce Development, Research & Analysis, Long Term Projections, 2010-2020 (www.hoosierdata.in.gov/dpage.asp?id=39&view_number=2&menu_level=smenu4&panel_number=2)

Understanding the Benefits of Workforce Churn

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The importance of workforce churn in a healthy labor market is often overlooked. The topic does not create media buzz and is often misinterpreted as a detriment. Being a product of the '70s and '80s, the word churn conjures up images of shark chum and the pulsating theme from “*Jaws*.”

While I don't suppose others have this same reaction, there always seems to be a negative connotation associated with workforce churn. It could be that many people long for a time when individuals worked for a single company their entire careers. Perhaps the idea of switching jobs and the resulting increased uncertainty goes against society's tendency toward risk aversion.

Despite the concerns, a modest level of workforce churn is both acceptable and beneficial, while extreme movements can signal problems in the labor market. Income opportunity is a major benefit of churn. As a person increases their skills and value, the ability to seek higher wages in an open labor market is a benefit to the greater society. Limiting or restricting this worker mobility would likely signal less opportunity for advancing wages. If a person were stuck at a particular position or company, the potential for income advancement would likely be hindered. When economists discuss “full employment” they do not imply a zero percent unemployment rate. They assume an unemployment rate of 2 percent to 5 percent. This remaining unemployment is called “frictional unemployment” which is acceptable and allows for the benefits of worker mobility.

Indiana Churn

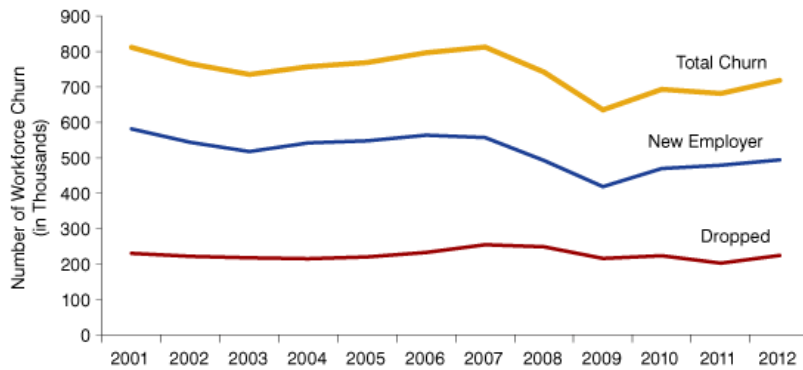
In an effort to understand the churn in Indiana's labor market, historical wage records were pulled from the Indiana Workforce Intelligence System (IWIS). It contains records from the administrative Indiana Department of Workforce Development (DWD), which are collected quarterly. However, the quarterly data increase volatility, so yearly averages were employed to help smooth seasonal effects.

The first measure examined was the new employer count. From one quarter to the next, the wage records were compared to determine which employees had switched to a new employer. The count of individuals with new employers was then summed for the quarter. The four quarters for the year were averaged. It should be noted that this measure is not without flaws. For example, individuals within a large company may be transferred between departments or facilities. Depending on the coding of the DWD administrative records, this might be signaled as a change of employer, though it could easily be argued otherwise. Additionally, this count might be inflated some due to treatment of temporary or second jobs. This analysis treats movement with multiple job holders as a count, even when the primary job might have been constant. This count has the potential to be slightly inflated for these reasons. (Some efforts could be expended to reduce these effects, but for the purposes of this analysis, the absolute count was less important than the overall trend.)

A second measure compared wage records to determine which individuals dropped out of the workforce. The count of dropped individuals was summed for the quarter, and the quarters were averaged for the year. The cause was not determined. They could have sought employment out of state, moved for personal reasons, became unemployed, retired or any number of other reasons. The dropped measure was not susceptible to the count inflation of the new employer measure. The person was present one quarter and not the next.

The two measures of workforce churn were pulled and summed as a total (see **Figure 1**). The results are presented numerically.

Figure 1: Total Workforce Churn in Indiana, 2001 to 2012



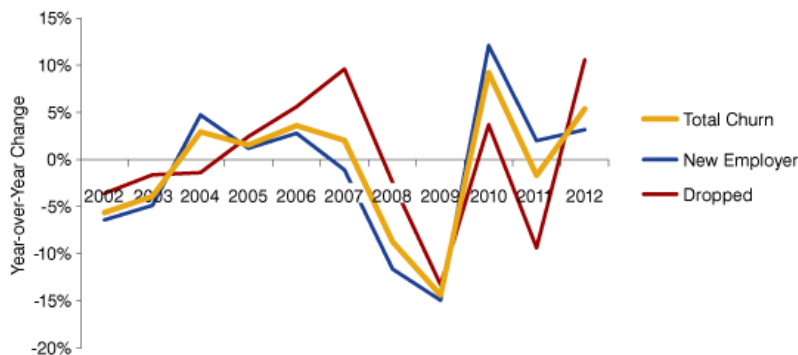
Source: Indiana Department of Workforce Development, using Indiana Workforce Intelligence System data

The new employer average count peaked in 2001, but remained relatively stable until 2006. After 2006, it fell until 2009 and has since recovered modestly. The dropped average count remained more stable through the analysis time frame. There was a slight buildup in 2007 and 2008 and a decline thereafter.

The level of workforce churn in Indiana likely comes as a surprise to many. During the time period studied, on average, about 8 percent of the workforce disappeared from the wage record each quarter. An additional 18 percent were listed with a new employer. A significant portion of Indiana's workforce was in motion from quarter to quarter.

The rates of change over time appeared to be modest, given that the lines tend to be fairly flat. In an effort to magnify small changes in workforce churn, the data were computed as percentage change from one year to the next. In this way, minor changes in the measures would be amplified (see **Figure 2**).

Figure 2: Indiana Workforce Churn Year-over-Year Percentage Change, 2002 to 2012



Source: Indiana Department of Workforce Development, using Indiana Workforce Intelligence System data

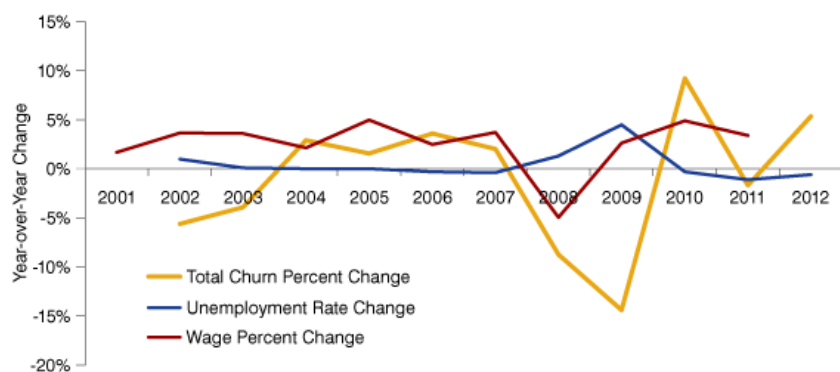
Figure 2 illustrates that the general trends of the measures were similar. There were modest increases in workforce churn from 2002 through 2006 and 2007. After 2007, there was a dramatic decrease in workforce churn associated with the economic downturn. The workforce churn began an uneven recovery from the 2009 bottom, but increased in 2012.

Churn During and After the Recession

The first thing to note was that workforce churn decreased during the 2007 recession period. It might be natural to assume that workforce churn would increase during a recession as people lost employment. However, the data suggest otherwise. From 2006 to 2007, the workers finding new employers started to decline. There was a spike in dropped workers in 2007, likely an indication of increased worker displacement at the onset of the recession. After 2007, both churn measures dropped precipitously. As workforce churn is healthy, the onset of the recession had a profound impact on worker movement. After the initial round of layoffs (the spike in dropped workers), the labor markets froze with inactivity. The freezing in the labor markets resulted in higher unemployment and reduced (or negative) wage growth.

Evidence of the relationship between workforce churn and its importance to the overall economy (such as unemployment and wages) were examined by plotting changes and comparing for correlation. Total churn was compared to the changes in the Indiana yearly average unemployment rate change and wage percent change in **Figure 3**.

Figure 3: Indiana Workforce Total Churn Percentage Comparison to Annual Average Unemployment Rate Change and Wage Percent Change, 2001 to 2012

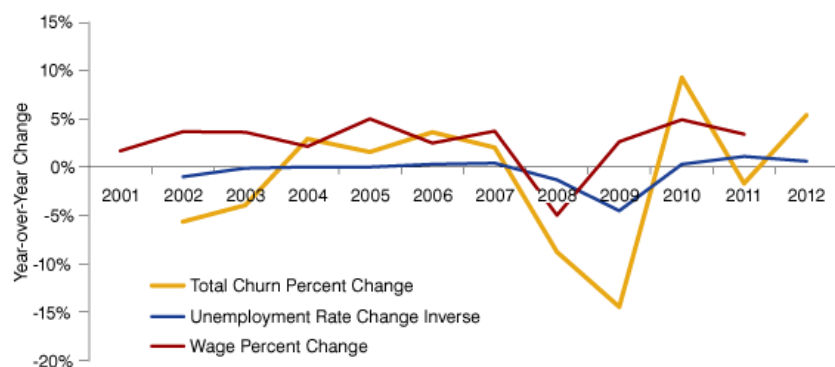


Source: Indiana Department of Workforce Development, using Indiana Workforce Intelligence System data

As workforce churn numbers grew modestly from 2003 to 2006, the unemployment rate decreased slightly and wage growth held steady. Between 2007 and 2009, the workforce market froze (lower rates of workforce churn), unemployment spiked and wage growth went negative. After 2009, workforce churn worked back unevenly toward normal levels while unemployment rates and wages began to recover.

To further illustrate the correlation of these elements within the labor market, the inverse of the unemployment rate change was taken and overlaid with the total churn and wage growth. **Figure 4** demonstrates the importance of even slight movements in workforce churn on the labor market, the broader economy and future trends.

Figure 4: Indiana Workforce Total Churn Percentage Comparison to Annual Average Unemployment Rate Change Inverse and Wage Percent Change, 2001 to 2012



Source: Indiana Department of Workforce Development, using Indiana Workforce Intelligence System data

Conclusion

While one might wish for a romanticized version of a static workforce, the data suggest that the marketplace for skills within the labor market is a turbulent mix of supply and demand. Nearly 8 percent of Indiana's entire workforce leaves the labor market from one quarter to the next (in excess of 200,000 Hoosiers by quarter since 2007). In total, about 25 percent of the total workforce experiences some type of change or movement in the labor market each quarter.

Rather than being a negative, the analysis suggests that a vibrant and chaotic labor market with large percentages of workforce movement is correlated with less unemployment and positive wage growth. The conclusion of workforce mobility and churn as beneficial at these levels has corroboration in current literature.¹

The features of a healthy labor market work in concert rather than opposition. While it is easy to idealize static labor markets, the implication of such an environment would be a scene of higher levels of unemployment and lower rates of wage growth. Workforce churn is much larger than generally perceived and has an important role in the economy. Its impacts are both substantial and positively tied to other beneficial outcomes within the labor market.

Notes

1. Quentin Fottrell, "Typical U.S. worker now lasts 4.6 years on job," *MarketWatch*, January 12, 2014, www.marketwatch.com/story/americans-less-likely-to-change-jobs-now-than-in-1980s-2014-01-10.