

Indiana's Talent Gap and Brain Drain/Gain Workshop: *Making Indiana a Magnet for Jobs and Talent*

April 26, 2017



Workshop Report

Office for Research and Partnerships

Purdue University

Acknowledgements

Workshop Partners:

- Purdue University
- Indiana Chamber of Commerce
- Lilly Endowment Inc.
- Indiana Commission for Higher Education
- Indiana INTERNnet

Workshop Steering Committee:

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- Kerri Begley, Indiana Chamber of Commerce
- Janet Boston, Indiana INTERNnet
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- Bo Beaulieu, Purdue Center for Regional Development
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INTRODUCTION

On April 26, 2017, Purdue University, in collaboration with the Indiana Chamber of Commerce, the Lilly Endowment Inc., the Indiana Department of Workforce Development, and Indiana INTERNnet, hosted *Indiana's Talent Gap and Brain Drain/Gain Workshop – Making Indiana a Magnet for Jobs and Talent*. Funding to support the workshop was provided by the Lilly Endowment Inc. as part of a grant to Purdue University under its “Initiative to Promote Opportunities through Educational Collaborations, Round III.” The workshop was held in conjunction with the Indiana Chamber of Commerce’s 53rd Annual Human Resources Conference and Expo at the Indianapolis Marriott Hotel East.

The aims of the collaborative group planning the workshop were to delve into the persistent assertions of a talent/skills gap encountered by Indiana businesses and a brain-drain of Indiana graduates leaving for the coasts. Two data points seem to corroborate these issues. In a survey conducted in 2016 by the Indiana Chamber of Commerce, 45% of the companies that responded reported underqualified applicants as the reason for their jobs in Indiana going unfilled. For the 2013-14 through 2015-16 academic years, 50% of Purdue bachelors-level graduates in STEM fields that were from Indiana found employment after graduation outside the state.

However, the issues are much more complex than these two data points would indicate, and many stakeholders across business and industry, state and local government, K-12 and higher education, and foundations and other nonprofit organizations have been – and are now actively involved in – efforts to make progress. We can also point to recent successes: the move in 2015 of the cloud-services technology firm Appirio from San Francisco to Indianapolis, and *Forbes* magazine’s recent ranking of Indianapolis as fifth in the nation for creating tech jobs.

The workshop sought to bring together a large number of stakeholders to define our status and make projections into the future; review programs, policies and strategies that have been successful with the goal of scaling or adopting as best practices; formulating strategies for future actions; and providing takeaways for the attendees to make a difference in their organizations.

The workshop consisted of three panel discussions aimed at framing and defining the challenges, creating jobs and filling the talent gap, and attracting talent to Indiana. We also asked all attendees to complete a one-page questionnaire (either paper or online) aimed at tapping their knowledge and experiences with the topics of the workshop. This report includes synopses of each panel discussion and of the responses to the questionnaire. The appendices contain the presentations and handouts that some of the panelists created.

KEY TAKEAWAYS

Key takeaways from the workshop are:

Where are we? (status, projections)

The talent/skills gap is real. The Indiana Chamber of Commerce's annual survey continues to find that many companies have unfilled positions due to a shortage of qualified applicants. In the latest survey, 45% of responding companies reported this situation. The Indiana Department of Workforce Development analysis of 109 occupations it tracks indicates that there are 25,000-30,000 jobs available, but we are only creating 8,000-9,000 people to fill those jobs. Ascend Indiana reviewed data gathered by Battelle and the Lumina Foundation and is projecting that by 2020, 62% of Indiana's jobs will require post-secondary educated workers. Currently only 42% of central Indiana residents have a post-secondary credential. An analysis by the Purdue Center for Regional Development shows that Indiana also is falling further behind the rest of the nation in the proportion of its adult citizens who have a bachelor's degree or higher. Ascend Indiana projects that by 2020, 200,000 jobs in central Indiana will go unfilled.

The brain drain is also real, but its characteristics are different from the common perception that we lose our best people to the coasts. Faculty and students in the Krannert School of Management at Purdue conducted an analysis of data gathered by Purdue's Center for Career Opportunities over several years from graduating students. The analysis shows that 60% of Indiana-resident Purdue students remain in the state when they graduate. This proportion drops somewhat to 52% for graduates in STEM majors (Science Technology, Engineering and Mathematics). Of particular interest is where the graduates go when they leave. Significant numbers do go to California, Texas and Florida. However, a larger number go to other Midwest states (Illinois, Wisconsin, Ohio, Kentucky, and Michigan). The Krannert faculty and students also analyzed migration data for 2015. In contrast to the situation regarding Purdue recent graduates, these data show that Indiana essentially breaks even with respect to the number of college graduates entering and leaving the state, and has a slight net gain in people without college degrees.

What are we doing? A lot...

A number of efforts are underway to examine and address disconnects between job-seekers and jobs. A collaboration between the Indiana Department of Workforce Development and Ivy Tech analyzes jobs availability versus skills required for those positions. The aim is to align Ivy Tech to offer the right programs at local campuses to meet the needs of regional job demands. The Central Indiana Corporate Partnership (CICP) has several initiatives aimed at improving the matching of job-seekers and employers in targeted sectors (Ascend Indiana, Conexus, TechPoint, OrthoWorx) and are seeing significant results.

Employers report that the most common gap in preparation for new employees is in the area of professional skills (sometimes called "soft skills"), including teamwork, oral and written communication, time management, problem-solving, work ethic and the ability to accept and learn from criticism. The Chamber of Commerce, Department of Workforce Development, and State of Indiana have launched a work ethic certificate program targeting middle and high school students.

Experiential learning programs and opportunities are particularly effective both in better preparing students to be employees and in retaining talent for Indiana companies (since both the employer and employee get to have an extended test-drive to better inform their respective decisions). Many of the workshop attendees reported that co-op and internship programs are key components in their company's recruitment strategies. Since 2001, Indiana INTERNnet has provided an internship-matching program that has served many companies and students from Indiana colleges and universities. The career services offices in most Indiana colleges and universities actively partner with business and industry to place students in internships. As one example, Ascend Indiana, University of Indianapolis and Community Health are partnering for work-and-learn and co-op opportunities for students in nursing. All the recent graduates on the workshop's Attracting Talent to Indiana Panel had participated in internships and reported that their experiences had a major impact on the direction of their careers.

Companies that build strong connections to the communities in which they operate, and that strongly encourage and support their employees to be part of the community, have found that these activities help in retention of employees. They report this as a selling point in attracting new talent. One panelist described Eli Lilly and Company's very long history of strong involvement in the Indianapolis metro area (and other communities in which the company has offices and facilities). Many employees sit on local boards and volunteer their time. Another panelist referred to a program run by TrendyMinds, a small firm in Indianapolis, that encourages its employees to volunteer. Building a sense of belonging with the community is also a goal of IndyHUB, a BioCrossroads initiative to connect 20- and 30-somethings with social, volunteer and networking opportunities.

ACTIONS

Based on the panel discussions and inputs from attendees, the following are the key strategies and actions as a result of the workshop:

- Continue the many successful programs and policies that are having a positive impact on filling the talent and skills gap and countering brain drain. For those programs that have been successful in individual communities or regions, look for ways to scale them up or duplicate them in other parts of the state.
- Sharpen our branding of Indiana as we work to attract both companies and talent to the state. Brand Indiana for what it has (low cost of living and doing business, livability, small business opportunities, strong sense of community, personable and friendly), instead of focusing on what it does not have. Tailor messages to all audiences we are trying to reach – Indiana citizens and businesses, and talent and companies in other states. Consider that much of our competition for Indiana-resident graduates comes from other Midwestern states.
- Better communicate what is already taking place and connect and leverage our current initiatives. This workshop is one attempt to broaden communication and foster connections. Other examples include the annual convening by the Lilly Endowment Round III: Call to Action of all participating colleges and universities, and the annual E2E Convergence: an Indiana Education-to-Employment, conducted by Indiana University and IUPUI.
- Consider establishing a state-wide body/committee/task force to increase communication and collaboration among ongoing programs and efforts, seek to broaden the reach of successful efforts, sharpen and coordinate marketing and publicity efforts, and assess and evaluate status and results.

DETAILED SYNOPSIS OF PANEL DISCUSSIONS

Keynote Panel: Responding to the Challenge

Panelists:

- Sue Ellspermann – president, Ivy Tech Community College of Indiana; former Indiana lieutenant governor
- Mark Ferrara, vice president of talent management, Eli Lilly and Company
- Suresh Garimella (moderator), executive vice president for research and partnerships and professor of mechanical engineering, Purdue University



Left to right: Mark Ferrara, Sue Ellspermann and Suresh Garimella

Key points from panel discussion

Sue Ellspermann

- Indiana is the only state with a statewide community college system. Since most of Ivy Tech’s students stay in Indiana, the college is working to understand what types of jobs, and how many, are required in Indiana.
- Ivy Tech and the Indiana Department of Workforce Development (DWD) are collaborating to analyze the state’s status for training and educating its workforce. They are developing a decision support tool for stakeholders across education, government and business/industry.
- Visualization decision support tool is one of the results of the Ivy Tech and DWD collaboration. Users can drill down into workforce alignment by economic sector and occupation cluster. The tool also supports detailed views by economic growth region within the state.
- The goal is for Ivy Tech to offer the right programs at local campuses to meet the needs of regional job demands.
- Ivy Tech regularly partners with four-year institutions and local employers.
- The Indiana Career Council was formed four years ago as a partnership of government, industry and higher education. Ivy Tech is a member of the council. The council developed a strategic plan to align education and training with the needs of Indiana’s regional economies.
- Ellspermann believes we are well positioned because government, business, labor are all working together. We have strong mayors and quality of place in our communities.
- Ivy Tech’s message to business/industry and other potential collaborators is, “Don’t be afraid to come to us to say ‘we need to work together.’”
- Coworking spaces are a key way to support new small businesses. Just two examples are Launch Fishers and Matchbox Co-working Studio in Lafayette.
- Higher education is partly responsible for teaching professional skills (sometimes referred to as soft-skills), but partnerships with business are important for helping new grads develop those skills. Co-ops, apprentice programs and internships are ways to learn applied skills.

Mark Ferrara

- Eli Lilly is a global company but has a long history in Indianapolis. “We (Eli Lilly) believe we are a fabric of this community (Indianapolis) and have since 1876,” Ferrara said.
- Lilly strongly supports the Indianapolis metropolitan community and encourages and enables its employees to get involved in their communities (whether in central Indiana or other locations where Lilly has facilities). Lilly employees volunteer and sit on boards. Lilly is a strong supporter

of the United Way in Indianapolis.

- The result of this involvement is more connection between its employees and the community. This strong connection helps in retaining current employees and is a selling point in attracting new talent.
- “When we act cohesively, I think we get more done,” said Ferrara
- Eli Lilly has experienced the skills gap in acquiring technical and scientific personnel. Its challenge is to attract scarce talent to come to Indiana. The company has attempted to improve its marketing efforts to make Indiana and Indianapolis more attractive to potential employees.
- Eli Lilly believes that innovation is tied to the diversity in its workforce.
- We should brand Indiana for what it is and not for what we are competing against.
- As a large enterprise with many suppliers, Eli Lilly makes an effort to use small local or in-state businesses.

Creating Jobs and Filling the Talent Gap Panel

Panelists:

- Caryl Auslander, vice president, education and workforce development policy, Indiana Chamber of Commerce
- Mike Barnes, associate chief operating officer for employer engagement, Indiana Department of Workforce Development
- Bo Beaulieu, director, Purdue Center for Regional Development
- David Hummels (moderator), dean of the Krannert School of Management and professor of economics at Purdue
- Sally Reasoner, vice president of talent identification, Ascend Indiana



Left to right: David Hummels, Caryl Auslander, Bo Beaulieu, Mike Barnes and Sally Reasoner

Key points from panel discussion

Caryl Auslander

- In the Indiana Chamber of Commerce’s 2016 annual survey, 45% of the companies responding indicated they had unfilled positions due to a lack of qualified applicants.
- The survey also indicated that 27% of the companies cited filling their workforce as their biggest challenge.
- Responding companies listed weak soft skills as an issue when bringing on new workers.
- Half of the companies that responded are offering tuition reimbursement programs but of those, many report low participation by current employees.
- The Chamber, DWD and the state of Indiana have launched a work ethic certificate program aimed at high school and middle school students. The governor is supportive of K-12 student participation and signs each certificate. The requirements for the certificates are driven by local employers and based on the needed skills they see as lacking. Teachers then determine how to teach these skills in the classroom. Results to date include a significant reduction in disciplinary actions among the students who complete the certificate.

Bo Beaulieu

- The Purdue Center for Regional Development produced a report entitled, “People and Places, the Nature and Location of Talent in Indiana.” Bo discussed some of the key findings. The report is included in the Appendices.
- The percent of Indiana adults aged 25 years or older with a bachelor’s degree or higher is 24.1% while the national level is 29.8%. This gap of 5.7% has been expanding consistently (the gap was 2.4% in 1970).
- The proportion of Indiana adults with some college or an associate’s degree is keeping pace with the national proportion.
- The educational attainment-level results are dependent on population density. Metropolitan areas in the state have a higher proportion of individuals with bachelor’s and higher degrees.
- Indiana has a mixed record in brain-gain over the past 25 years (1990-2015). Comparing the

actual growth in educational attainment with the expected growth based on the national average, the increase in individuals at bachelor's level and above is well below the national average, while the increase in individuals with some college or associate level is marginally above the national average.

- In terms of the number of workers within technology-based occupation clusters from 2001 to 2015, post-secondary education and knowledge creation grew by 26% while engineering declined by 9%. The number of workers in the skilled production-based occupation cluster also declined by 7% over that same time period.
- Overall, skilled production-based occupations employ over 280,000 Hoosiers, more than the six technology-based occupation clusters combined (which employ approximately 254,000 individuals).
- Broadband availability can be a major obstacle to business development in rural Indiana.

Mike Barnes

- The Department of Workforce Development (DWD) projects that, for the next few years, two-thirds of job opportunities will be replacement (retirement, etc.) as compared to new positions. The DWD is working to understand the nature of these jobs with respect to where they are located (metro, rural areas) and what skills and education are needed. The Department is also working with educational institutions to help close that gap through short-term certificates and other measures.
- DWD focuses its efforts on below-bachelor's level jobs (high school-plus).
- DWD analysis indicates a gap in generating employees. Of 109 tracked occupations, there are 25,000-30,000 jobs available with a high school diploma plus a certificate or credential. However, Indiana is only training 8,000-9,000 people to fill those jobs.
- DWD analysis considers industry characteristics, potential disruptions, the correct occupations on which to focus, the necessary skills to fill the available and coming jobs, and the correct education level for these jobs.
- DWD is working on collaborations now in Hamilton County and Jefferson County, trying to mix metro and rural needs.
- The department's work with Ivy Tech helps to align resources to meet the needs identified.

Sally Reasoner

- Based on the findings of studies by Battelle and Lumina, Ascend Indiana is projecting that by 2020, 62% of Indiana's jobs will require post-secondary educated workers.
- The state of Indiana has set a target year of 2025 for having 60% of its adult citizens achieve a post-secondary credential. Currently only 42% of central Indiana residents have a post-secondary credential.
- The education gap is caused by too few students enrolling in higher education, concentrating on high-demand fields, completing post-secondary credentials, and finding a job in Indiana upon graduation.
- Projections indicate that by 2020, 200,000 jobs in central Indiana will go unfilled. Ascend is creating a network to connect job-seekers and employers. It will include profiles for both employers and job-seekers as well as pre-qualification by Ascend.
- We need a common definition of employability skills and how they are measured. Currently, different definitions are used by different government, education and industry organizations.
- Ascend Indiana, the University of Indianapolis and Community Health are partnering for work-and-learn and co-op opportunities for nursing students.

Attracting Talent to Indiana Panel



Ann Mears

Kevin Mumford

Molly Chavers

Kristina Bender



Angela Petrie



Megan McKinney



Corey Elliot

Panelists:

- Molly Chavers, executive director, IndyHub
- Ann Mears (moderator), regional outreach director, Indiana INTERNnet.
- Kevin Mumford, professor of economics, Krannert School of Management, Purdue
- Four recent or soon-to-be graduates from Indiana universities:
 - Kristina Bender, Purdue, now PR and social media specialist at TrendyMinds
 - Corey Elliot, IUPUI, now press secretary in the Office of the Indiana Attorney General
 - Megan McKinney, Ball State, soon to be associate consultant at Capgemini International
 - Angela Petrie, Purdue, now marketing coordinator at Blue & Company

Key points from panel discussion

Kevin Mumford

- Based on the American Community Survey from 2015, Indiana has a relatively small net inflow of people. Looking at persons with bachelor's degrees, Indiana essentially breaks even and has a small inflow of people without college degrees. Other Midwest states show similar results – relatively small net inflows or outflows. California, Florida and Texas all have large inflows.
- The skill premium (the salary difference between people with and without college degrees) is smaller in Indiana than either the national average or the average in Midwest states. Employers pay less for college-level workers in Indiana than in other states.
- Based on surveys of Purdue recent graduates from 2003-2014, about 60% of in-state students stay in Indiana after graduation. Considering only STEM graduates, 52% stay.

- The likelihood of staying after graduation depends significantly on the graduate's major. For example, 94% of graduates who became social workers stayed while only 27% of chemical engineers stayed.
- The average SAT scores and grade point averages of the graduates who stayed were lower than for those that left.
- Although a significant number of graduates who left went to California, Texas and Florida, a larger number went to other Midwest states (Wisconsin, Michigan, Ohio, Kentucky and Illinois), with the largest number going to Illinois. *This indicates that Indiana is not necessarily competing with mountains, coasts and warm weather, as is often assumed. Rather, we are competing with other states that are similar to Indiana.*
- Among out-of-state domestic Purdue graduates, 12% stayed in Indiana but 55% of them returned to their home states.
- For those out-of-state graduates who did not go back to their home state, we see a similar pattern as with in-state students. California and Texas attract many, but more go to other Midwest states, with Illinois and Ohio having the largest numbers.

Molly Chavers

- IndyHub was started by BioCrossroads as an initiative to attract and retain talent in central Indiana.
- IndyHub targets 20 and 30-somethings (often called Millennials) and seeks to engage its members by getting them engaged in the community through churches, volunteer opportunities, social events and other measures. However, only 40% of those surveyed thought their company values volunteer activities.
- IndyHub conducted surveys of its membership in 2013 and 2015. Results indicate that increased civic engagement leads to more attachment to city and employer.
- Survey results also indicate that the primary reason for coming to Indianapolis was job opportunities. Many 20- and 30-somethings leave employers because they do not see a clear career path going forward.
- Indianapolis has made significant strides in attracting talent over the past several years.
- Based on the success of Indianapolis, we need to start marketing what our cities and towns have rather than what they do not. No Mean City is a collaborative initiative that was started in 2013 and is spearheaded by IndyHub to help attract talent to live in Indy.
- Central Indiana provides job opportunities like the coasts, but also provides even beginning employees access to company leaders.

Kristina Bender

- Kristina is a recent Purdue graduate in communication. She did several internships during college. She got a job with a global PR firm in Chicago but did not like the commuting time, cost of living and large company size. She has found her place in Indianapolis with TrendyMinds, a small boutique PR firm.
- TrendyMinds provides its employees time off for volunteer activities. If the employee invests his or her own time as a volunteer, the company will support additional activities during working hours.

Angela Petrie

- Angela received a Lilly Endowment scholarship to study at Purdue. She visited the San Francisco area, but, as she said, "I realized I would be homeless in a day," because of the cost of living. She

waited for an opportunity and took one in Columbus, Ohio, with Blue and Company.

Megan McKinney

- Megan is graduating from Ball State in May 2017. She decided after an internship to pursue a career in cyber security. She has a job in this area lined up in Chicago.

Corey Elliott

- Corey graduated from IUPUI in journalism but also took courses from Ivy Tech. He pursued both paid and unpaid internships and other opportunities during his time in college. These were invaluable to building his resume and understanding what type of career options he wanted. He is press secretary for the Office of the Indiana Attorney General.

QUESTIONNAIRE RESULTS

The questionnaire was distributed in two forms to the attendees of the workshop. A paper version was made available to all attendees of the concurrent workshop session and was collected on the day of the event. An online survey version was also distributed via email on May 1, 2017 to all who registered for the workshop. A total of 18 responses were completed and are tabulated below.

Organization type

- business/industry – 13
- government – 1
- higher education – 3
- non-governmental organization – 1
- other – 0

Has your organization experienced a talent/skills gap?

- 11 organizations - Yes

What types of skills have you experienced a gap in? Differentiate by educational level, nature of position, job-specific/technical skills or professional skills (e.g., communication, critical thinking).

- Skilled web developers
- Communication skills
- Technicians – industrial maintenance/equipment service
- Talent with 2-5 years' experience
- Project manager level in civil engineering (site design, transportation, water, etc.)
- Nature of position – college-level, part time; technical skills – startup technology, customer service, IT help
- Professional skills – commitment, critical thinking, professional words in speaking and writing, manners, team focus versus “me” focus, patience in working within company’s systems and culture
- People with cross-functional civil engineering skills, project management; most talented engineers are happily employed and not looking
- Middle skill manufacturing positions – do not require college degree but are advanced enough to require additional training in a CTE center, at Ivy Tech, or on-the-job
- Professional positions – regulatory affairs, engineering professions
- Gaps in problem solving, critical thinking and project management
- Technology, facilitation, presentation skills

What do you believe are the root causes of such a talent/skills gap if it exists, and can you suggest two solutions?

- Not enough early education (i.e., elementary & secondary) that teaches kids about finances, high-paying careers and cost of living
- More investments in co-ops, internships, social innovation projects
- Lack of workplace experience before college graduation
- Limited supply in high demand area. 1. Increase awareness with educators in local communities. 2. Encourage students to pursue this path.
- Exposure (or lack of). Start earlier in school -- perhaps a readiness certificate at 8th grade and

upon graduation

- Engineers are often not seeking other jobs because they like routine and stability. More college contact for alumni that graduated 6-10 years or more.
- Talent desire bigger jobs and better salaries without experience. Solution -- technical apprentice/co-op
- The disintegration of the family unit. "Everyone getting a trophy" mentality. And the lack of accountability and ability to hide behind a screen (i.e., computer, phone, etc.). People at a younger age need to be able to fail and be coached on how to progress through it -- mentally, physically, and with manners.
- Not enough civil engineering graduates are willing to move to Indiana or stay in Indiana. We have not had much success with out-of-state talent if they have no ties in Indiana. Two possible solutions would be for higher education to keep alumni lists available to Indiana employers so that they can look for individuals who have graduated during a certain time period for the required years' experience. After talking with career services at Purdue, they said it would not be an issue locating graduates within the last 5 years or less, but the 6-10 year time-frame may be more challenging. Another solution is to sell Indiana for what it is through social media, professors, government and employer. Have an organized method of disseminating the information (a committee, task force, etc.).
- Tech students are not attracted to Indiana, nor attracted to manufacturing jobs.
- Inadequate pipeline of HS and incumbent worker candidates for production jobs: 1. Increased focus on career opportunities in manufacturing 2. Targeted incentives to drive interest and adoption.
- Difficulty of attracting and retaining professional talent to rural area: 1. Continued policy emphasis on quality of place 2. Other support services such as trailing spouse programs
- Root causes - scarce talent unwilling to relocate to Indianapolis. Solutions - improved understanding of the benefits of living in Indiana.
- Dated thinking and dated talent acquisition approaches by most HR people. And CEOs not having high enough expectations on HR people to solve the problem. HR people by and large (and I am an HR person) REACT to openings. Then they follow all the old processes of filling a job. At the same time, bosses of HR people aren't usually thinking about changing the thought processes and philosophies around filling positions. They are busy thinking about other business challenges. HR and CEOs are adept at TALKING about the problem, "We can find people," and they don't know where to start. Solution - stop talking about it and start somewhere. Begin by having interns. Eventually managers realize that the interns are better than some of their own team members. This raises the bar on what to expect from people. Identify schools and universities that produce the type of talent/skills you are looking for - and get to know people there – don't just show up when it's time for the career fair. Fill jobs from within, and develop a "bench" of talented people ready for the entry point (not necessarily entry LEVEL, but entry POINT).
- We are a social services agency and we require a 4-year degree in a human services field. I think the lack of skills is attributed to lack of emphasis on these skills in this field.

What efforts and programs has your organization implemented to recruit talent?

- Writing content about our core values and culture. Selling who we really are.
- Increased practical education from 73% to 93% in 4 years
- Recruit from the pool that is already served by our work and initiatives; plug into person-to-person online recruiting (LinkedIn, Indiana INERNnet)

- Started Manufacturing Education Partnerships in Decatur City with education and other industries, participate in job fairs, career fairs, class activities, as well as community events
- We use internships and co-ops for developing a talent pipeline and have recurring teams for campuses across the country.
- Partnering with universities and schools, also military organizations and job fairs; Conexus, recruiters, staffing agencies
- Internships
- Internships, education
- Took advantage of Wabash County and Ivy Tech grants for industrial tech training
- Internship, blogging, applicant tracking system, various perk programs once hired (keeping in mind it's important to keep "recruiting" your current employees.
- Referral bonuses, LinkedIn, Facebook, job ads at Monster and recruiting agencies.
- Rotational development program....hiring people before we need them....developing them for nearly a year...but having them at the ready when openings occur.
- We are a small organization of 10 full-time staff. It seems to me that we use personal connections in order to replace departing staff.
- See ThinkOrtho.Net
- Improved our marketing efforts of both Indianapolis and Indiana
- Deep relationships with schools within Purdue and Rose-Hulman, and developing relationships with Indiana State, UIndy, Ivy Tech, and others. This leads to equipment donations, speakers, tours of our facility, classes at our facility, sponsorship, etc. We host a STEM Forum each year to promote technical jobs and careers, and the associated education, pay potential, etc. This event is geared towards middle schoolers and their parents (and their teachers and guidance counselors). Internship program, job shadowing, teacher job shadowing, professor sabbatical
- Attend/host career fairs; maintain a relationship with the major universities in the state who have a strong focus on social work/human services programs.

Where do you look for new employees (educational institutions in Indiana; beyond Indiana; national conferences, national recruitment web sites, other)?

- National job boards, Techpoint job board, Indiana college sites, social media, employee referral
- Emphasizing university relationships. Also Independent Colleges of Indiana (ICI)
- Educational institutions in Indiana
- Indiana schools, online (www.indiana.honda.com), co-ops
- Educational institutions in Indiana and beyond, national conferences, partnership with Purdue, research ongoing at universities, participation in national conferences (SWE, NSBE, SHPE, etc.)
- Staffing agencies, Career Builder, schools and universities, military organizations, employee referrals, co-ops
- Educational institutions, web (LinkedIn), Job fairs at colleges
- Within Indiana, Indeed.com
- Preferably Indiana region -- Indiana INTERNnet
- Our own website, Indiana INTERNnet, State Workforce site, Indeed, LinkedIn, Facebook, Twitter, networking groups, personal connections, church, local colleges
- We mainly look at Purdue and Rose-Hulman.
- Purdue, Rose-Hulman, Texas A&M. Starting also with Indiana State
- Relationships developed via national conferences is one avenue. These relationships can be developed through other means, but my tenure with the organization is so recent, I'm unsure exactly how they are developed.

- Global top tier schools and recruitment forums
- Educational institutions in Indiana, and beyond Indiana (e.g. Texas A&M, Big Ten schools). LinkedIn networking. Trade show networking. Employee referrals.
- Colleges/universities in Indiana; employee referrals

Briefly describe interesting programs other than those discussed at the workshop that aim to increase employment opportunities within Indiana.

- Legislative support for more attractive Venture Capital funding opportunities
- How do communities in Indiana survive?
- Honda Technical Co-op Program -- partnership with Ivy Tech AART Program -- school/work model
- Hiring veterans
- Tech groups

Briefly describe programs that were not mentioned during the workshop that aim to retain talent in, and attract talent to, Indiana?

- Techpoint, Indiana State Council of SHRM
- Independent Colleges of Indiana (ICI), small colleges, Conference on College Composition and Communication (CCCC) recruitment activities. Talk more about connecting with small, private colleges and universities.
- Coursework that includes high levels of employer engagement; coursework that is focused on solving real world/community issues.
- Honda college co-ops, Workforce Ready, Ready Indiana, EcD
- Pensions
- Johnson County's "Community Career and Education Forum" -- an awareness raising annual event that brings educators, manufacturers, 7th-9th grade students, and their parents together to start seeing the breadth of interesting job opportunities available if one does not close academic doors. Sept 28 is the 4th annual event. Last year it had 700 students (1,000 people overall). <https://www.us.endress.com/en/media-center/news-and-press-releases/ccef-2017-career-forum?highlight=ccef>
- South Carolina apprentice program
- Working within K-12 schools to inform, inspire and empower students when they are most open to learning about jobs and careers (educators tell us it is 7th, 8th, and 9th grade) and their parents. This creates an "imprint" on the student that there are cool jobs here in their community. And it helps parents give real info to their children about careers and opportunities, beyond just the jobs that mom and dad have.
- Re. attracting talent, I think initiatives like Aspire Johnson County, and the development going on in Franklin and Greenwood, along with the new visitors bureau in Johnson County serve to get the word out that we have a high quality of life in Central Indiana with a lower cost of living than most places in the US.

APPENDICES

1. Speaker/panelist bios
2. Presentation Slides: Dr. Sue Ellspermann
3. Handout: Ivy Tech – Visualization Tool Flyer
4. Presentation Slides: Dr. Bo Beaulieu
5. Report: *People & Places: The Nature and Location of Talent in Indiana* – Purdue Center for Regional Development
6. Presentation Slides: Dr. Kevin Mumford
7. Handout: Purdue – Indiana Workers – Where Do They Come From and Where Do They Go?
8. Social Media – Twitter during the Workshop

Appendix 1

Speaker/panelist bios

Indiana's Talent Gap and Brain Drain/Gain Workshop
Making Indiana a Magnet for Jobs and Talent
April 26, 2017

Speaker/Panelist Bios

Keynote Panel: Responding to the Challenge



Dr. Sue Ellspermann, Ph.D.
President
Ivy Tech Community College of Indiana

Dr. Sue Ellspermann has more than 30 years of experience in higher education, economic and workforce development, and public service. In May 2016, she was selected to serve as President of Ivy Tech Community College of Indiana. She is the ninth individual to hold the position and first female president for the college. Ellspermann assumed the role of President on July 1, 2016.

Ellspermann most recently served as Indiana's 50th Lieutenant Governor from 2013 until March 2016. She served as President of the Senate and Secretary of Agriculture and Rural Affairs, as well as oversaw six agencies.

Being named president of the nation's largest singly accredited statewide community college system marks a return to higher education for Ellspermann. From 2006 to 2012 she served as the founding Director of the Center of Applied Research and Economic Development at the University of Southern Indiana (USI). She also has classroom experience teaching at USI, University of Evansville and University of Louisville.

In her role with the Center of Applied Research and Economic Development at the University of Southern Indiana she engaged faculty, staff and students in applied research and consulting in more than 200 different projects to impact economic development in southwest Indiana, the state and region. With her background in industrial engineering, she also assisted the department of engineering through accreditation and developing industrial engineering curriculum. She also helped launch and later facilitate the college's strategic planning process during her six years at USI.

Ellspermann's educational and workforce development experience is extensive. As Lieutenant Governor she was vice chair of the Indiana Career Council tasked to align Indiana's education and workforce development system to meet the needs of employers. As the chair of the Pathways and Implementation Committee Ellspermann helped lead efforts on a strategic plan that aligns K-12, higher education and workforce development efforts to employer needs. She also served on the State Workforce Investment Council, an organization charged with developing opportunities for Hoosiers to gain employment and earn competitive wages, as well as developing and implementing workforce solutions based on the input of representatives of local workforce development boards.

In 2010 Ellspermann was elected as the State Representative for District 74 (portion of Dubois, Spencer, Perry and Warrick counties).

The 20 years prior to joining the University of Southern Indiana, she owned and operated Ellspermann and Associates, Inc., d/b/a Basadur Applied Creativity, an independent consulting firm licensed in the training and facilitation of Simplex Creative Problem Solving.

Ellspermann holds a Ph.D. and M.S. from the University of Louisville in Industrial Engineering. She holds a B.S. from Purdue University also in Industrial Engineering. Ellspermann has published research and reports on various topics including workforce development, innovation, and problem solving.



Mark Ferrara
Vice President Talent Management
Eli Lilly and Company

Mark Ferrara is vice president of human resources, responsible for talent management at Eli Lilly and Company. Mark's responsibilities include global employee recruiting, assessment, learning and development, staffing (including succession management), performance management, diversity, and HR research. He also has responsibility for the company's archives.

Mark's previous HR roles include senior director of compensation and benefits, and senior director of human resources supporting Lilly Research Laboratories. His Lilly experiences also include leadership roles in facilities management, where he was responsible for planning and maintenance of office space in Indianapolis. He initially joined Lilly in 1988 as a project architect designing research facilities.

Mark is a Purdue graduate and currently serves on the boards of Young Life in Indiana and Kentucky, the Indiana Historical Society, and Conner Prairie Interactive History Park. He and his wife have three daughters.



Suresh V. Garimella, Ph.D.
Executive Vice President for Research and Partnerships
Purdue University

Suresh Garimella is Purdue University's inaugural executive vice president for research and partnerships and the Goodson Distinguished Professor of Mechanical Engineering. He also continues to direct the National Science Foundation Cooling Technologies Research Center, which he founded in 1999.

Garimella oversees Purdue's \$600 million research enterprise, including Discovery Park, an interdisciplinary complex for grand-challenge research. He also is responsible for Purdue's international programs and its global and corporate partnerships endeavors.

Under his leadership, the University has experienced consecutive record years in research funding, established significant new partnerships around the world, and established two new life sciences institutes on integrative neuroscience and on inflammation, immunology and infectious disease.

The co-author of over 500 widely cited archival publications and 12 patents, Garimella has supervised over 90 graduate students, 22 of whom are now faculty members in prestigious universities. He has served as a Jefferson

Science Fellow at the U.S. Department of State and as a senior fellow of the State Department's Energy and Climate Partnership of the Americas (ECPA).

Garimella serves in editorial roles with leading energy-related journals. He is a fellow of the American Association for the Advancement of Science (AAAS), has received numerous awards for education and research.

Garimella received his Ph.D. from the University of California at Berkeley, an M.S. from The Ohio State University, and a bachelor's degree from the Indian Institute of Technology Madras.

Panel discussion -- Creating Jobs and Filling the Talent Gap



Caryl Auslander
Vice President, Education and Workforce Development Policy
Indiana Chamber of Commerce

Caryl joined the Indiana Chamber at the end of 2014 with more than 15 years of legislative and lobbying experience at the state and federal levels.

She came to the Chamber after nearly five years at The Corydon Group, where she represented more than 60 clients. During that time, she worked with a variety of organizations engaged in K-12 and higher education.

Caryl on education: "As a wife, daughter and sister of educators and also as a mother of school-age children, I understand the importance of a strong educational foundation for Hoosiers. It is important that we craft policy and implement programs to prioritize the needs of students first and foremost. They are our leaders and workforce of the future."

Caryl's extensive background includes time as state director of government affairs for Verizon Communications and legislative policy specialist with the Washington, D.C. law firm Patton Boggs, LLP. She also spent four years as public policy/regulatory specialist for the American Association of Blood Banks in Bethesda, Maryland.

Her first experience in state government was as an intern for former Senate President Pro Tempore Robert Garton. Caryl followed that up with three years on the Washington, D.C. staff of former U.S. Sen. Richard Lugar – the final two as assistant legislative director.

An Indianapolis native, she graduated with a double major and double minor from Indiana University Bloomington. Caryl resides in Carmel with her husband and two children.



Michael Barnes
Associate Chief Operating Officer for Employer Engagement
Indiana Department of Workforce Development

Michael Barnes is the Associate Chief Operating Officer for Employer Engagement at the Indiana Department of Workforce Development. He has received his Bachelor's

degree in Economics and a Masters of Business Administration. In addition, Michael has been a certified Project Manager and is a six sigma black belt. Prior to joining the state in 2009 he worked in private industry for more than 20 years. Michael worked in operations management for a fortune 50 transportation company. He then moved to be a part of leadership in an Indiana based business which grew from \$14M in annual sales to \$180M in three years, employing more than 4500 employees in the manufacturing services industry. His work has been recognized in the BKD Indiana Quality Improvement award. Michael serves as Chair for the Governor's Health Workforce Council. Michael also sits on the board of a local charitable organization; he lives in Indianapolis with his wife and three sons.



Bo Beaulieu
Director
Purdue Center for Regional Development

Dr. Bo Beaulieu is director of the Purdue Center for Regional Development and assistant director of the Purdue Extension Community Development Program. Beaulieu has played a major role in the launch of a number of innovative national research and Extension programs, including the National e-Commerce Extension Project, the extension rural entrepreneurship effort, and the [Stronger Economies Together \(SET\)](#) program in partnership with USDA Rural Development, and the Food Assistance Research Program in collaboration with the USDA Economic Research Service. He has been a key player engaged in the development and implementation of the Hometown Collaboration Initiative and the launch of the Rural Indiana Stats website, both in partnership with the Indiana Office of Community and Rural Affairs in 2014.

Bo has received a number of key awards over the past three years. In 2014, he was the recipient of the Distinguished Rural Sociologist Award given by the Rural Sociological Society, the Secretary of Agriculture (Tom Vilsack) Honors Award, and was inducted in the George Washington Carver Hall of Fame for Public Engagement at Tuskegee University. In 2016, the National Association of Community Development Extension Professionals honored him with the Distinguished Career Award.

Bo received his M.S. degree and Ph.D. degree in Sociology with a specialty in community development, both from Purdue University. He is also professor in the Department of Agricultural Economics.



Sally Reasoner
Vice President of Talent Identification
Ascend Indiana

Sally Reasoner joined Ascend Indiana in August of 2016 and serves as the Vice President of Talent Identification. In this role, Reasoner will work to attract talent to Central Indiana and connect talent with employers and training.

Reasoner started her career through the Governor Bob Orr Entrepreneurial Fellowship and credits that program with keeping her in the Hoosier state. As an Orr Fellow Reasoner worked at FinishMaster and was elected to serve as the Fellowship's Chief of Staff. Upon completion of her Orr Fellowship, Reasoner joined the Central Indiana Corporate Partnership to build the talent initiative at

TechPoint, Indiana's technology growth initiative. While at TechPoint, Reasoner served as the Director of Talent Initiatives and successfully launched four college-to-career programs aimed at building a tech talent pipeline for Central Indiana companies.

Reasoner holds a Bachelor of Arts in Political Science from DePauw University.



David Hummels
Dean and Professor of Economics
Krannert School of Management, Purdue University

David Hummels began serving as the Dean of the Krannert School of Management in 2015.

In his faculty life, Professor Hummels teaches courses in International Economics, and has won multiple teaching awards at the graduate and undergraduate level. His research focuses on a broad range of issues in international trade, including: offshoring, product differentiation, barriers to trade and the broader impacts of aviation, infrastructure, and trade facilitation on trade and economic development. He has published 4 books and over 40 research articles in major economic journals including American Economic Review, Journal of Political Economy, Quarterly Journal of Economics, Review of Economics and Statistics, the Journal of International Economics, and the Journal of Economic Perspectives.

Professor Hummels is a Research Associate of the National Bureau of Economic Research, an Associate Editor of the Journal of International Economics, and an Associate Director of the Forum for Research on Empirical International Trade. He has worked as a consultant for and visiting scholar at a wide variety of central banks, development banks and policy institutes around the world. He previously served on the faculty of the University of Chicago's Booth School of Business.

Panel discussion – Attracting Talent to Indiana



Kristina Bender
PR & Social Media Specialist
TrendyMinds

Kristina's business cards say PR & Social Media Specialist, but when you get down to it she's a brand wrangler, client motivator, boundary pusher and detail obsessor. A firm believer that great ideas and insights can come from anyone and anywhere, she is constantly searching for the next influential idea for the clients she serves.

As part of the marketing services team, Kristina works closely with the team on campaign strategy, message development and cross-channel message placement.

When she's not navigating the latest target audiences random note demands and learning what makes your audience tick, you can find her spending time with family and friends and exploring uncharted lands with her dog and partner in crime, Asia.

Kristina received a Bachelor of Arts in PR & Advertising from Purdue University in 2013.



Molly Wilkinson Chavers
Executive Director, IndyHub

Molly serves as Executive Director of IndyHub –a network, resource, and advocate for Indianapolis’ twenty- and thirty-somethings, providing a space to connect with people, community organizations and the city. IndyHub works to eliminate barriers through a culture of accessibility, regular outreach and relevant programs.

In 2013, Molly was asked to lead the *No Mean City* initiative – a collaborative effort to tell the real stories of life in Indianapolis. *No Mean City’s* online and printed tools exist to provide city residents (current and prospective) as well as our community’s front line ambassadors – realtors, recruiters and corporations – with a more honest, comprehensive perspective on life in Indy. The effort also provides public relations support to our city’s education, business, real estate and lifestyle offerings.

Prior to joining Indy Hub in June 2005, Molly served as the Finance and Special Events Director of the Indiana Democratic Party. She also served as Government Relations Liaison at St. Vincent Hospital and Health Services. Originally from Terre Haute, Indiana, Molly attended DePauw University. Molly is active on a variety of boards including Visit Indy, Mitch Daniels Leadership Foundation, and the United Way of Central Indiana.

Molly and her husband, Adam, are the proud parents of a daughter, Weezie.



Corey Elliot
Press Secretary
Office of the Indiana Attorney General

Corey Elliot is the Press Secretary for the Office of the Indiana Attorney General, responsible for all aspects of public relations for the office, including writing all press releases, facilitating interviews and scheduling media availability. Corey also is a Sports Correspondent for the Associated Press and covers both professional (Colts, Pacers, Fever) and college (Purdue, Butler, Indiana) sports teams. Prior to his role with the Attorney General, Corey was a Staff Writer for the *Daily Journal* (Johnson County, Indiana), writing stories on local government, breaking news and features.

Corey graduated in May 2015 from IUPUI with a B.A. in Liberal Arts with a sports journalism focus.

Megan McKinney
Associate Consultant
Capgemini International

Megan is graduating from Ball State University in June of 2017 with a major in Computer Information Systems with a goal of working in the cyber security industry. Her interest in cyber security began during the attack in Paris in

November of 2015, when the authorities found out that the attack was communicated through an encrypted App called 'Telegram.' The following year, she applied to the Security and Compliance internship at Ontario Systems. After interviewing and accepting the position, she began in May of 2016. Her internship was extended throughout the rest of her senior year, and she was nominated by her boss for *Intern of the Year* from Indiana INTERNnet.

In November of 2016 she accepted an associate consultant position at Capgemini International in Chicago, IL. She will be working in the insurance division and working with various departments including their security team. Megan's intent with this this move is to experience how an international company operates their security environment, and how a large company handles process improvements. She doesn't quite have the current knowledge and skills to be in their security department, but her intention is to pursue certifications during her work as an associate consultant.



Kevin Mumford
Professor of Economics
Krannert School of Management, Purdue University

Kevin J. Mumford is an Associate Professor in the Department of Economics at Purdue University. He earned a Ph.D. in Economics from Stanford University in 2007. Professor Mumford teaches courses in labor economics, public finance and taxation, managerial economics, and econometrics at the undergraduate, Master's, and Ph.D. levels. His research has focused on taxation, labor supply, poverty, fertility, education, and the role of human capital in measuring national wealth. He has published research articles in many academic journals including the American Economic Review, the Review of Economics and Statistics, the National Tax Journal, Environment and Development Economics, the

Journal of Economic Education, and the Journal of Econometrics.

Professor Mumford has received research grants from the Institute for Research on Poverty, the Upjohn Institute for Employment Research, the John M. Olin Program in Law and Economics, the Purdue Research Foundation, and the Alfred P. Sloan Foundation. He was awarded the John and Mary Willis Young Faculty Scholar Award for research excellence. Professor Mumford currently serves as the Director of Undergraduate Programs for the Department of Economics.



Angela Petrie
Marketing Coordinator
Blue & Co., LLC

Angela Petrie is the marketing coordinator at Blue & Co., LLC in Columbus, OH, where she manages all firm digital communications. She currently serves on the board of Women in Digital – a startup social enterprise based out of Columbus, OH – is on the American Advertising Awards Committee for the Columbus American Advertising Federation, and volunteers through Red Shoe Society – a young professional philanthropic organization benefiting the Ronald McDonald House of Central Ohio.

Before joining Blue & Co., Angela was a multimedia writer at Purdue University Marketing

and Media, an in-house agency for the university, and a marketing director for HotBox Pizza West Lafayette. She graduated from Purdue University in 2014, with a Bachelor's in Communication with a focus in public relations and rhetorical advocacy.



Ann Mears
Indiana INTERNnet

Ann Mears serves as the regional outreach director for Indiana INTERNnet, a non-profit organization managed by the Indiana Chamber of Commerce. Indiana INTERNnet is the catalyst for expanding the creation and use of experiential learning opportunities as a key strategy in retaining Indiana's talent.

She joined Indiana INTERNnet as program manager in July 2013. Personal experience with internships led to her passion of helping others acquire career opportunities through experiential learning. With a degree in hospitality and tourism management from Purdue University, she enjoys interacting with students and employers while guiding them through the resources Indiana INTERNnet provides.

Ann serves as the liaison between regional partners and Indiana INTERNnet, assisting with intentional internship placement in targeted regions within the state. She supervises Indiana INTERNnet staff and develops the post-secondary career fair schedule and outreach activities. In addition, Ann oversees the EARN Indiana program and management of the web site.

Appendix 2

Presentation Slides

Dr. Sue Ellspermann



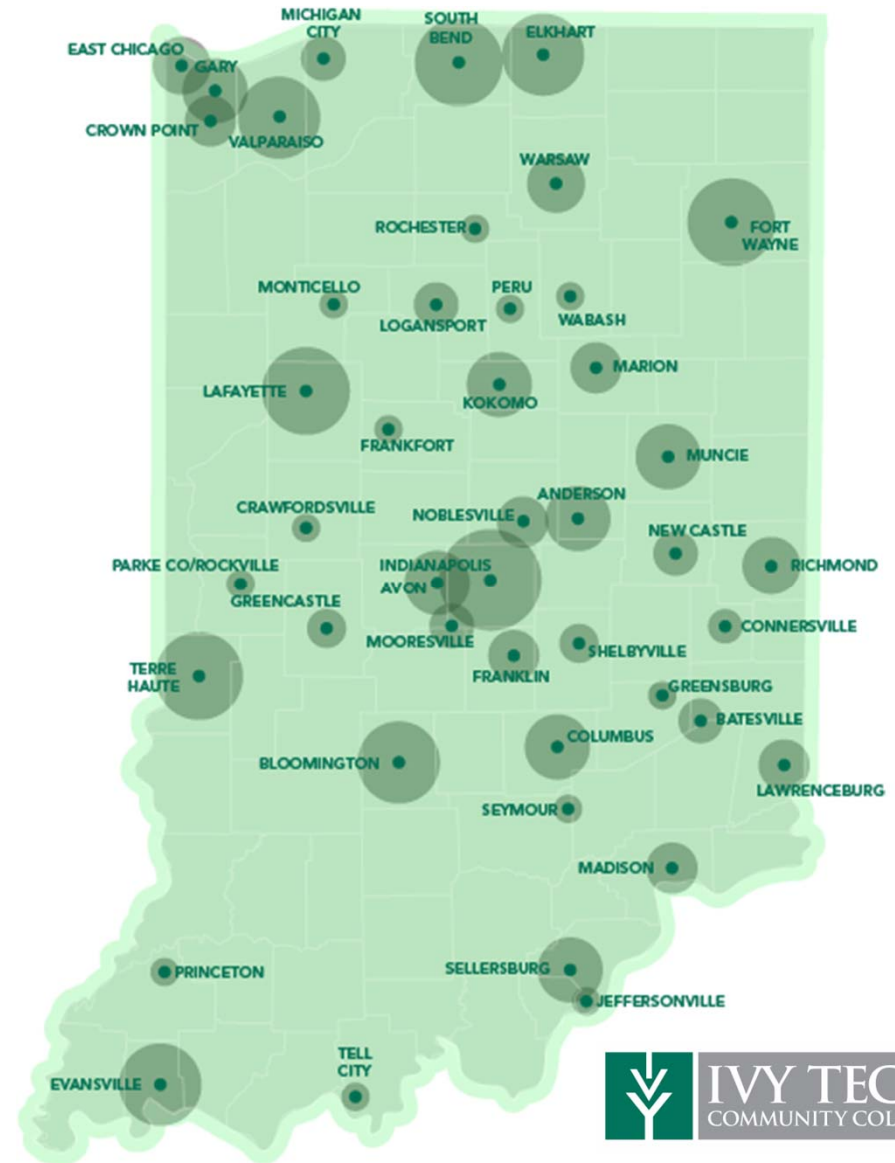
Indiana's Talent Gap and "Brain Drain"

April 26, 2017



Training and Educating Indiana's Workforce

- Jobs that need filled
 - High-demand, high-wage
 - 2/3 of new jobs require education past high school
- Students we must serve
 - Un-employed, under-employed
 - Gateway to the middle class
- Campus footprint
 - Offer the right programs locally that meet the needs of job demands
 - Partner with local employers and four-year institutions



Visualization Tool

<http://in.gov/dwd/viz.htm>

Workforce Alignment

- Manufacturing
- Healthcare
- Information Technology
- Logistics and Supply Chain Management
- Agriculture

Ivy Tech Workforce Alignment Tool

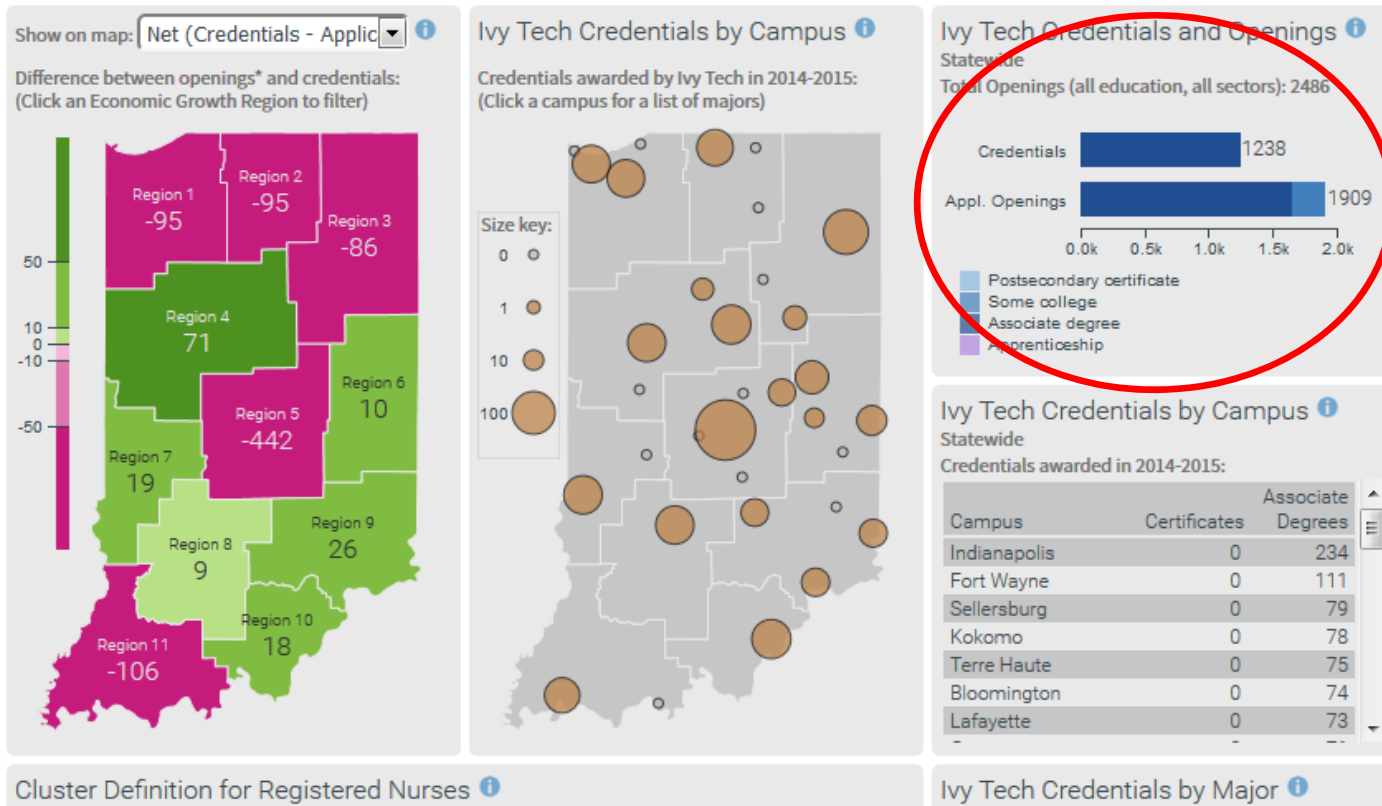
Detailed, actionable data about supply and demand in the job market

Priority Now Economic Sector: All Industry Sectors

Select occupation cluster: Registered Nurses

Registered Nurses

For jobs requiring more than a high school diploma but less than a bachelor's degree*



Quadrant 1:
Demand > Supply

Ivy Tech has
Excess Capacity,
High Workforce
Demand

Quadrant 2:
Demand > Supply

Ivy Tech at Capacity,
High Workforce
Demand

Quadrant 3:
Supply > Demand

Ivy Tech High
Enrollment,
Low Workforce
Demand

Quadrant 4:
Supply \approx Demand

At equilibrium

Initiatives

- Increase enrollment where workforce demand is high and supply is low
- Resource and facilities allocation
- Employer engagement
- K-12 Outreach
- Support for increased completions in Quad 1 programs

Thank You

Questions?



Appendix 3

Handout:

Visualization Tool Flyer

Ivy Tech Community College



VISUALIZATION TOOL

Partnership between Ivy Tech Community College and Indiana Workforce Development

FEATURING:

- Search capabilities by Economic Sector and Occupation Cluster
- Views by Ivy Tech credentials awarded, applicable openings, and net (credentials minus openings)
- Maps by Economic Growth Region

TRY THE TOOL FOR YOURSELF!
<http://in.gov/dwd/viz.htm>

QUADRANT 1:

DEMAND > SUPPLY

Ivy Tech has Excess Capacity,
High Workforce Demand

QUADRANT 2:

DEMAND > SUPPLY

Ivy Tech at Capacity,
High Workforce Demand

QUADRANT 3:

SUPPLY > DEMAND

Ivy Tech High Enrollment,
Low Workforce Demand

QUADRANT 4:

SUPPLY \approx DEMAND

At equilibrium

INITIATIVES

- Increase enrollment where workforce demand is high and supply is low
- Resource and facilities allocation
- Employer engagement
- K-12 outreach
- Support for increased completions in Quad 1 programs

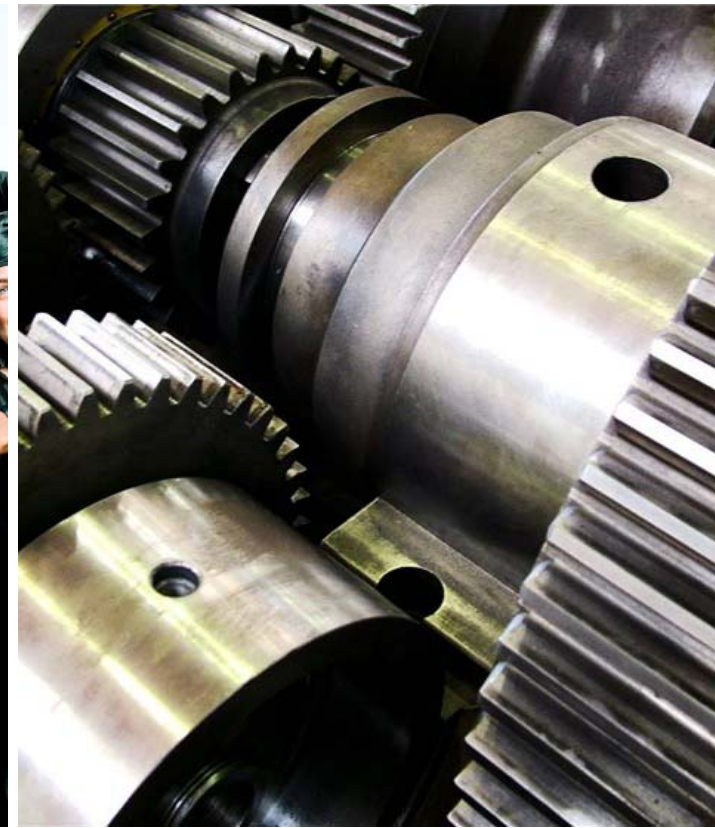
Visit <http://in.gov/dwd/viz.htm> to start using the Visualization Tool today!



Appendix 4

Presentation Slides

Dr. Bo Beaulieu



PEOPLE & PLACES: *THE NATURE AND LOCATION OF TALENT IN INDIANA*

Bo Beaulieu, PhD
Purdue Center for Regional Development

A REVIEW OF KEY FACTS

SUPPLY:

- Indiana's Key Human Capital Assets
- Brain Gains Across the State

DEMAND:

- The State of Indiana's Knowledge-Based Economy
- Technology and Production-based Occupation Clusters



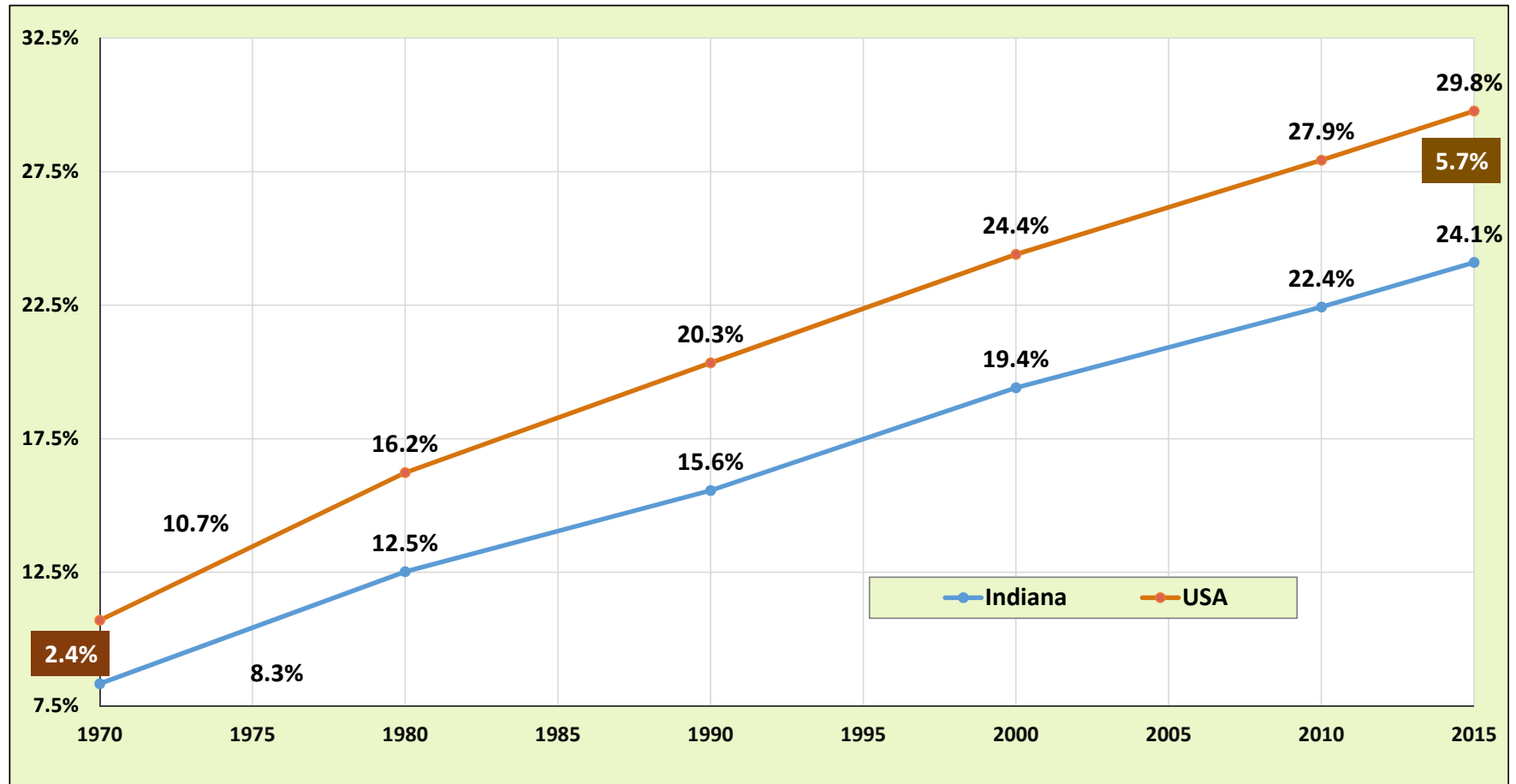
Fact #1:

**Indiana's Best
Educated Adults . . .**

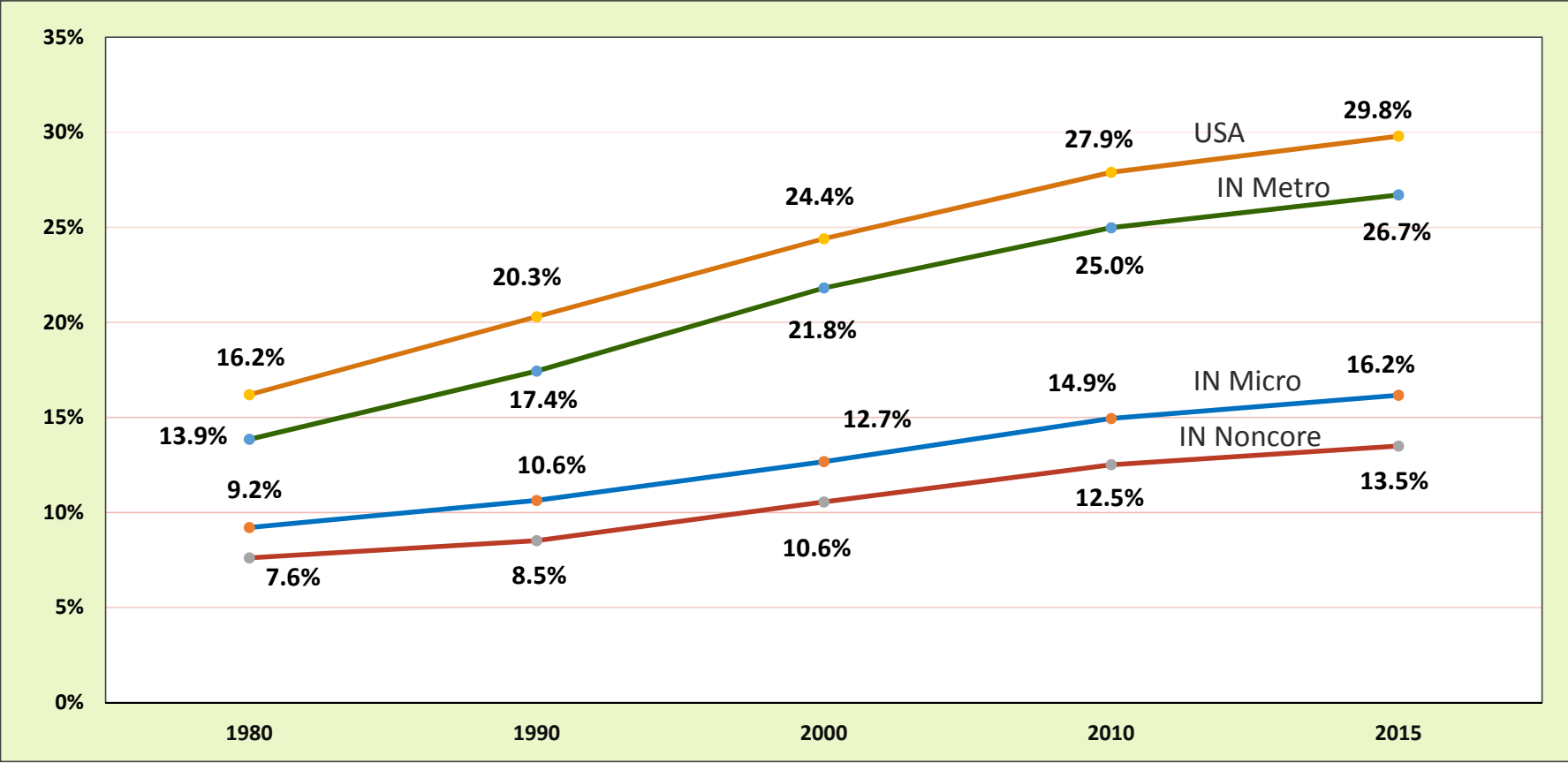
**Not keeping pace
with the U.S.**



Percent of adults (25+ years of age) with a bachelor's degree or higher in the U.S. and Indiana, 1970-2015



Percent of adults (25+ years of age) with a bachelors' degrees or higher, by metropolitan status, 1970-2015



Source: Census, ERS, NHGIS, PCRD, Waldorf 2006

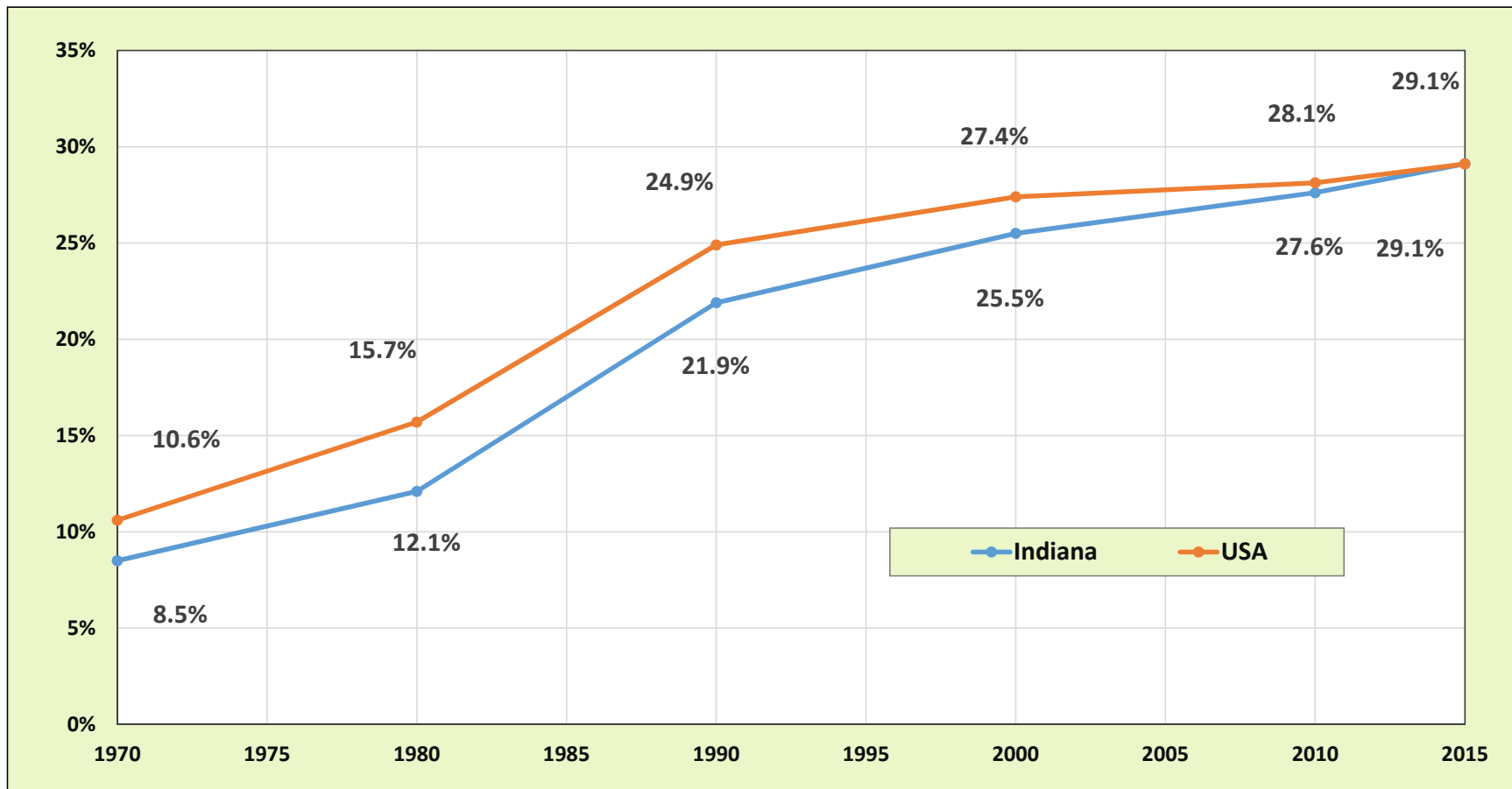
Fact #2:

**Adults with Some
College or Associate
Degrees. . .**

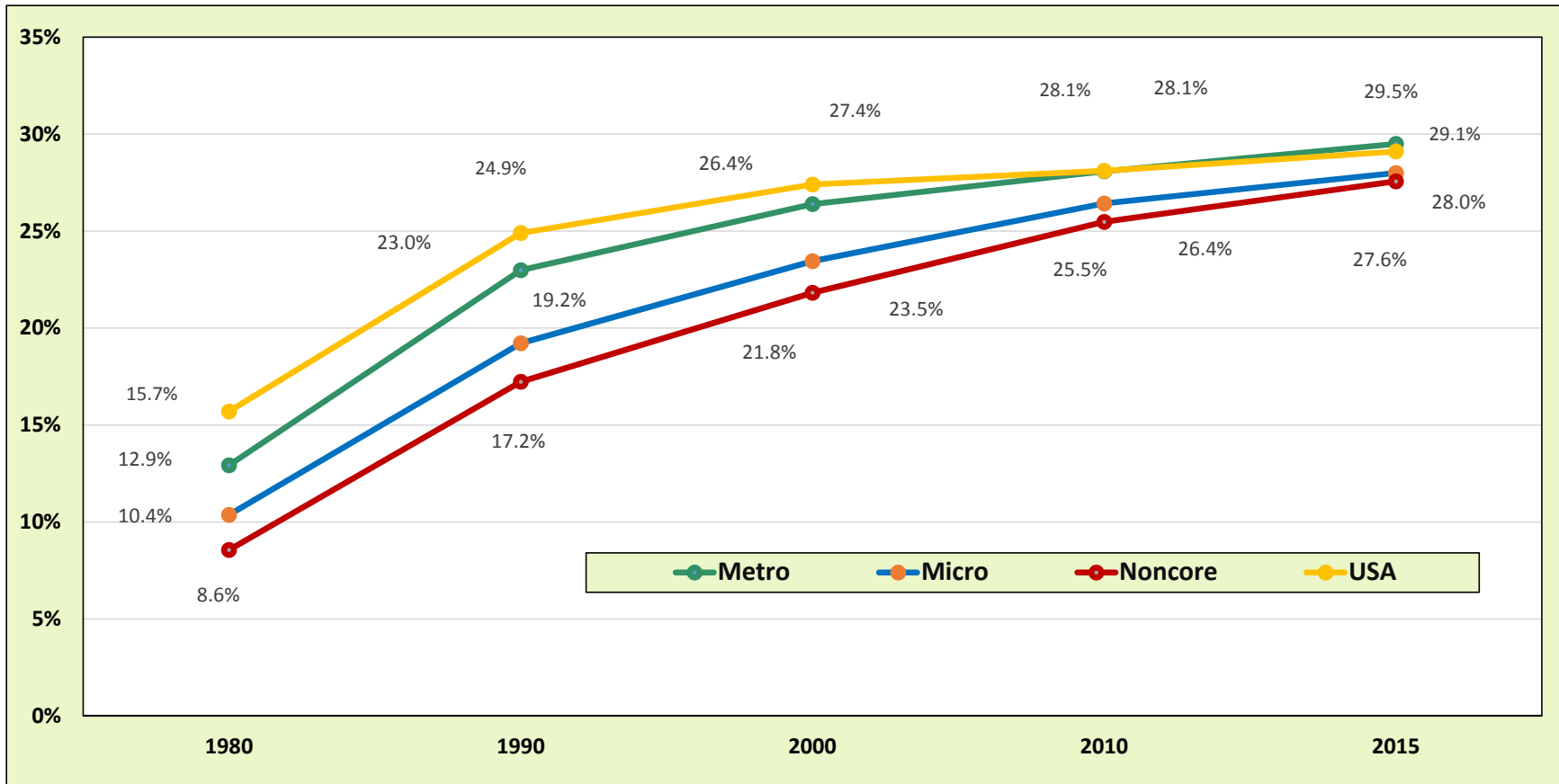
**Matching the U.S., but
reason for concern!**



Percent of Adults (25+ years old) with some college or associate degrees, 1970-2015.



Percent of Adults (25+ years old) with some college or associate degrees by metropolitan status, 1970-2015.



Fact #3:
**Brain Gains in
Indiana:**

**Mix record over the
past 25 years**



Table 1. Shift-Share Analysis of Indiana’s Educational Attainment, 1990-2015

| Metropolitan Status | Bachelor's or higher, 2015 | Expected Change (National Growth Rate, 1990-2015) | Actual Change (1990-2015) | Competitive Shift |
|----------------------------|---|--|----------------------------------|--------------------------|
| Metro | 567,128 | 432,051 | 111,555 | - 320,496 |
| Micro | 70,254 | 60,304 | 6,667 | - 53,637 |
| Noncore | 27,365 | 22,553 | 3,584 | -18,969 |
| <hr/> | | | | |
| Metropolitan Status | Some college or associate degree, 2015 | Expected Change (National Growth Rate, 1990-2015) | Actual Change (1990-2015) | Competitive Shift |
| Metro | 981,462 | 333,629 | 381,003 | 47,374 |
| Micro | 188,984 | 63,822 | 74,118 | 10,296 |
| Noncore | 86,415 | 26,724 | 38,318 | 11,594 |

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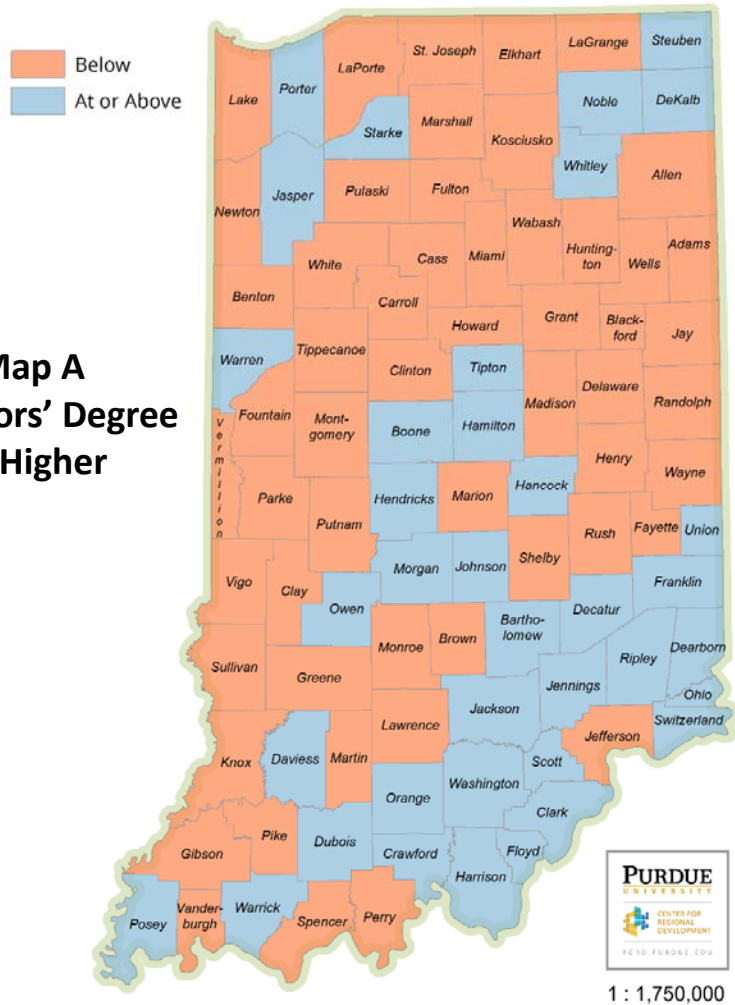
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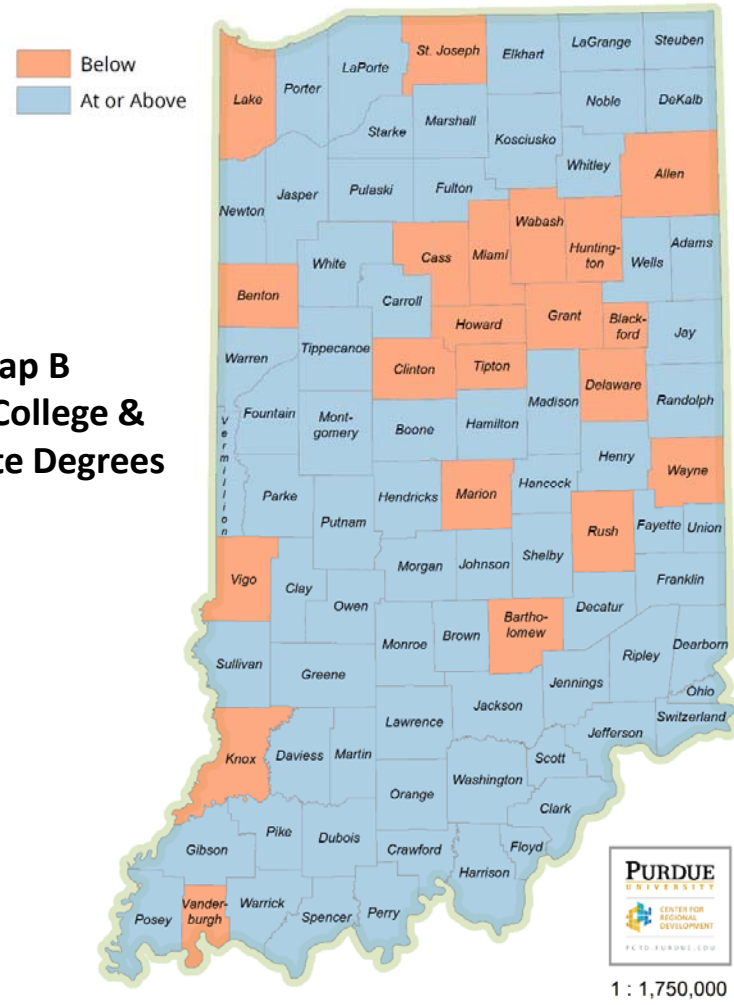
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Map A
Bachelors' Degree
or Higher



Map B
Some College &
Associate Degrees



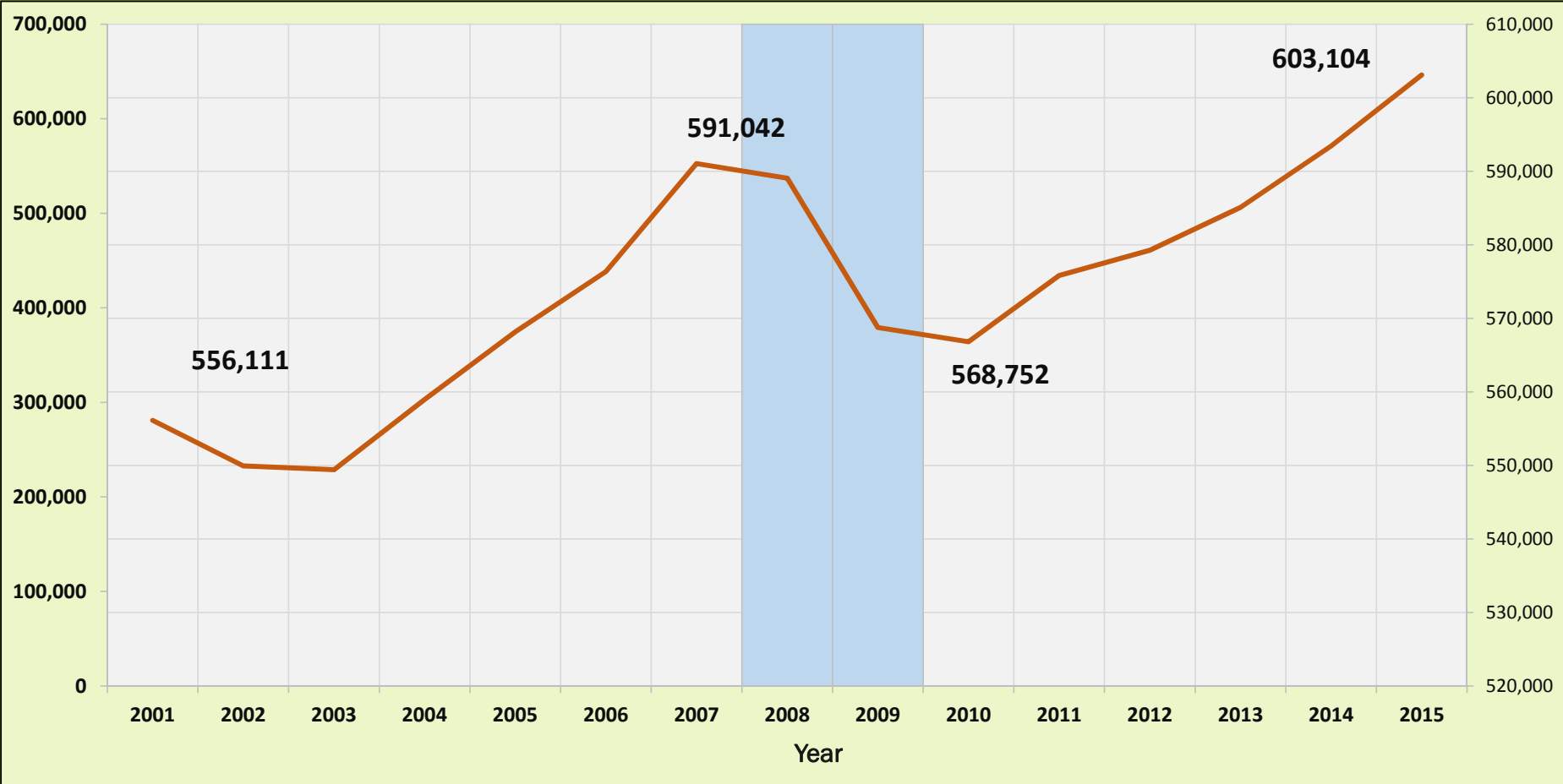
Fact #4:

**Knowledge-Based
Economy:**

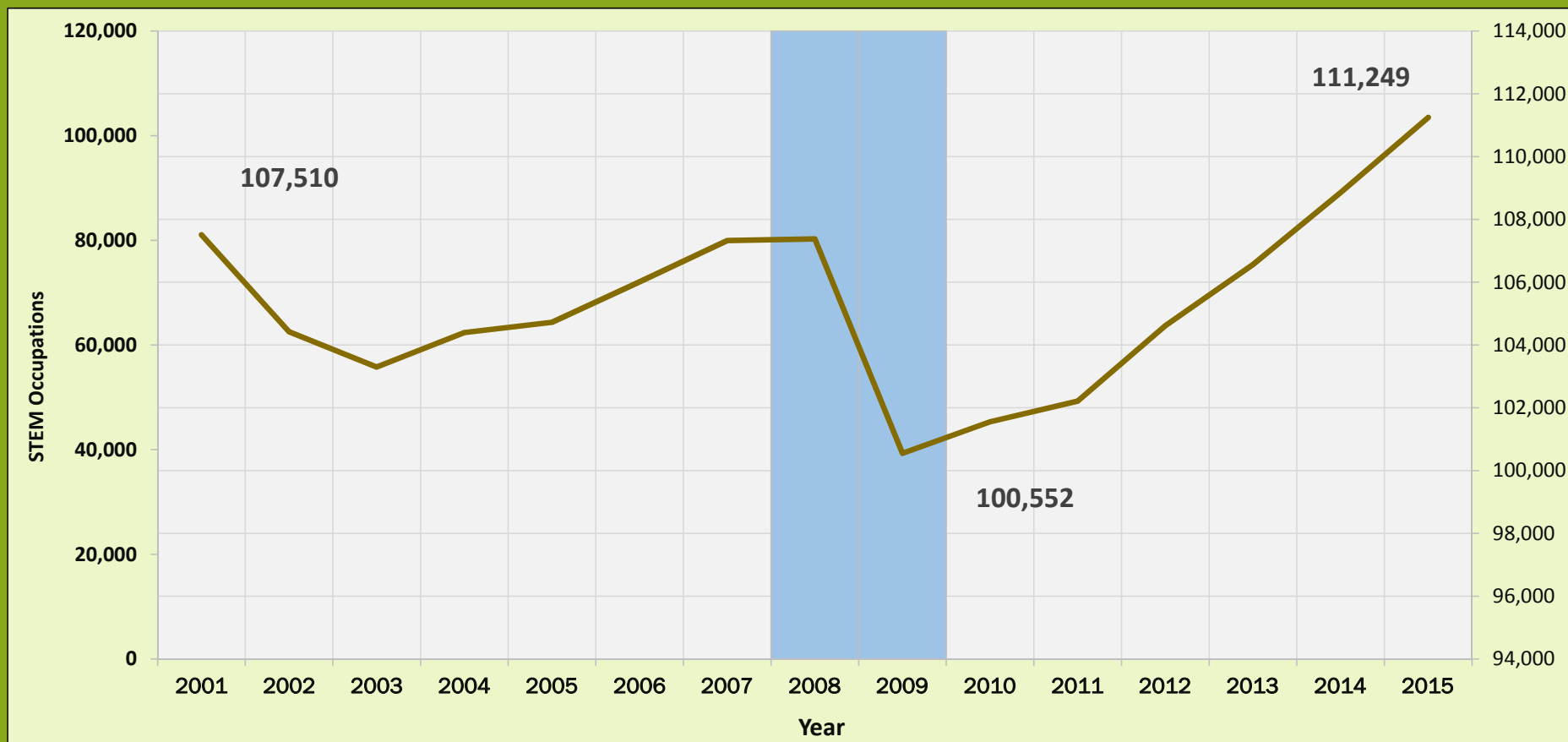
**“Creative” & “STEM”
Occupations**



Number of Jobs in the Creative Occupations in Indiana, 2001-2015



Number of Jobs in STEM-Related Occupations in Indiana, 2001-2015



Note: STEM occupations are comprised of 68 5-digit SOC groups delineated by using research from ESA, Dept. of Commerce and NSF. It does not include agriculture or arts.

Table 2. Number of Workers Associated with Seven Occupation Clusters in Indiana, 2001-2015

| Technology-based Occupation Clusters | 2001 Jobs | 2015 Jobs | Change | % Change |
|--|------------------|------------------|----------------|-----------------|
| Post-Secondary Education and Knowledge Creation | 34,321 | 43,301 | 8,980 | 26% |
| Medical Scientists and Practitioners | 29,068 | 34,888 | 5,820 | 20% |
| Information Technology | 55,768 | 61,711 | 5,943 | 11% |
| Natural Sciences & Environmental Management | 11,224 | 12,186 | 962 | 9% |
| Mathematics, Statistics, Data and Accounting | 65,036 | 67,433 | 2,397 | 4% |
| Engineering | 38,380 | 34,991 | - 3,388 | - 9% |
| Skilled Production-based Occupation Cluster | 302,971 | 280,826 | -22,145 | -7% |

FORTHCOMING



People and Places

The Nature and Location of Talent in Indiana¹

Lionel J. Beaulieu & Indraneel Kumar²

April 2017

INTRODUCTION

On a number of fronts, Indiana's economy is showing signs of strength. The state's average unemployment rate of 4.4 percent in 2016 placed it among the top 20 states in the nation. Recent Bureau of Labor Statistics data reveal that the state's unemployment rate continues to decline, registering at 3.9 percent in March 2017. No doubt, the improved employment situation is the result of the increasing number of people added to the workforce over the past decade. For example, the number of nonfarm workers employed in the state stood at 2.98 million in February 2007, but has grown to more than 3.11 million today, a healthy expansion of 4.5 percent since 2007. Furthermore, the state's real gross domestic product (the most comprehensive measure of economy activity for states) stood at \$336.1 billion in 2015, 16th best in the United States. The most significant contributor to the state's GDP was durable goods manufacturing, accounting for nearly 16 percent of Indiana's GDP.³ According to a recent estimate released by the Indiana Business Research Center, Indiana's GDP is expected to expand at a faster pace than the

Please contact ljb@purdue.edu to receive a copy of the report when released,

Appendix 5

Report:

People & Places: The Nature and Location of Talent in Indiana

Purdue Center for Regional Development

People and Places

The Nature and Location of Talent in Indiana¹

Lionel J. Beaulieu & Indraneel Kumar²

April 2017

INTRODUCTION

On a number of fronts, Indiana's economy is showing signs of strength. The state's average unemployment rate of 4.4 percent in 2016 placed it among the top 20 states in the nation. Recent Bureau of Labor Statistics data reveal that the state's unemployment rate continues to decline, registering at 3.9 percent in March 2017. No doubt, the improved employment situation is the result of the increasing number of people added to the workforce over the past decade. For example, the number of nonfarm workers employed in the state stood at 2.98 million in February 2007, but has grown to more than 3.11 million today, a healthy expansion of 4.5 percent since 2007. Furthermore, the state's real gross domestic product (the most comprehensive measure of economy activity for states) stood at \$336.1 billion in 2015, 16th best in the United States. The most significant contributor to the state's GDP was durable goods manufacturing, accounting for nearly 16 percent of Indiana's GDP.³ According to a recent estimate released by the Indiana Business Research Center, Indiana's GDP is expected to expand at a faster pace than the U.S. through 2018.⁴

While the state's overall economic picture continues to improve, other data offer reasons for concern. The state's annual population growth rate, for example, has lagged behind that of the U.S. for the better part of 15 years. Even though Indiana experienced at 4 percent growth in its population between 2007 and 2016, the pace of growth was ranked 35th among the nation's 50 states. Furthermore, its median household income (\$50,532) was 36th best in the nation. Moreover, 15.4 percent in the state's population fell below the poverty line in 2015 and that figure has swelled to nearly 22 percent among children under 18 years of age (in 2015). And on the education front, Indiana has the 3rd highest ranking when it comes to the proportion of adults (25+ years of age) with a high school degree (or equivalent), but the percentage of the adult population with a bachelor's degree or higher stands at 24.1 percent, among the lowest one-fourth of all states in the nation.⁵

¹ This paper is a product of Purdue University's *Transforming Indiana into a Magnet for High Technology Jobs* effort, funded by the Lilly Endowment as part of its "Round Three: Initiative to Promote Opportunities through Educational Collaborations."

² Beaulieu is Director of the Purdue Center for Regional Development (PCRD) and Professor in the Department of Agricultural Economics. Kumar is Regional Planner:GIS & Spatial Analysis with PCRD. Their contact information is ljb@purdue.edu and ikumar@purdue.edu.

³ Data were drawn from a number of sources, including *Hoosiers by the Numbers*, *StatsAmerica* and the Bureau of Economic Analysis. Another resource tapped was the January 2017 report by Todd P. Siebeneck and Albert H. Yoon titled, *Gross Domestic Product by State* (https://faq.bea.gov/scb/pdf/2017/01%20January/0117_gdp_by_state.pdf).

⁴ See *Indiana's Outlook for 2017* report published in the *Indiana Business Review* and authored by Timothy F. Slaper and Ryan M. Brewer, Winter 2016, Volume 91, No. 4. <http://www.ibrc.indiana.edu/ibr/2016/outlook/indiana.html>.

⁵ Data reported in this paragraph were drawn from *StatsAmerica* and the U.S. Census Bureau's *American Fact Finder*. The Indiana education information is based on a five-year estimate for the 2011-15 time period.

It is this mix of statistics – some positive and some troubling – that prompted us to examine the state of education, talent and jobs in Indiana. Our focus was guided by two complementary strands of research. The first, advanced by a number of economic theorists over the years, suggests that investments made by individuals in their education and skills development can have profound impacts on their productivity and job-related earnings over their life course. A second line of research notes that economic opportunities available to individuals are not solely the result of their human capital attributes, but also on the quality of jobs that exist in the local labor market. As such, the ability of workers to realize economic gains is a consequence of the match (or mismatch) between their education/skills and the quality of jobs existing in their communities or counties. Thus, where you live matters a good bit. This paper will examine how the supply and demand for human capital might vary across different areas of Indiana, including among the state’s metropolitan and nonmetropolitan areas.⁶

KEY QUESTIONS TO EXPLORE

As Indiana strives to be a major economic force on both the national and global stage, a key issue is whether it has the requisite pipeline for the high skilled, technology-based workforce that is central to a 21st century economy. A related matter is whether all geographic areas of the state – be they metropolitan or nonmetropolitan – can be active contributors to the knowledge-based, technology-driven environment that the state is striving to achieve. In an effort to begin examining these two critical issues, this paper seeks to explore the following key questions:

1. What is the state of Indiana’s human capital assets? Is the proportion of adults with post-secondary degrees increasing over time? Are the Indiana figures on par with national trends?

2. Are metropolitan and nonmetropolitan areas achieving comparable success in expanding their pool of educated adults?

3. Given their educational levels, what returns are working Hoosiers realizing in terms of employment and earnings?

4. What counties in the state are realizing brain “gain” at a pace that matches or exceeds the national rate; which ones are falling behind?

5. Are knowledge and STEM-based jobs increasing in Indiana and across the state’s metro and nonmetro landscape?

6. How competitive are metropolitan and nonmetropolitan areas when it comes to the presence and strength of technology and production-oriented occupation clusters?

Questions 1 through 5 are intended to explore the “supply” side of the state’s human capital while questions 5 and 6 address the quality of jobs existing in the state, the so-called demand side of labor markets.

⁶ For a more extensive examination of these theories, see *Investing in People: The Human Capital Needs of Rural America*, by Lionel J. Beaulieu and David Mulkey (eds.), Wetview Press, 1995.

EDUCATIONAL ATTAINMENT: INDIANA'S HUMAN CAPITAL ASSETS

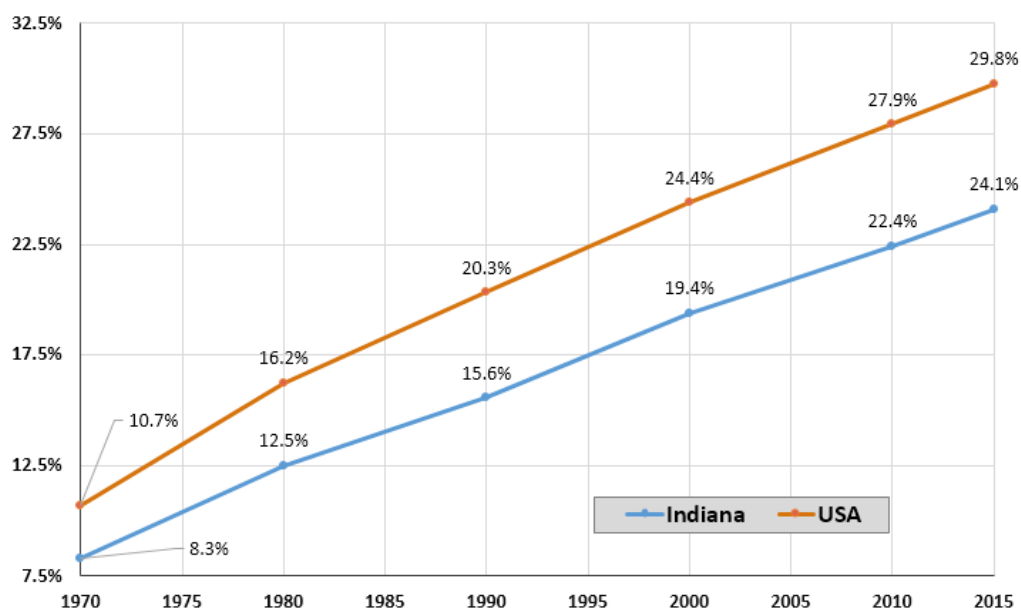
Human capital researchers have noted a link between earnings and the human capital attributes of individuals. The higher the educational attainment of individuals, the greater their lifetime earnings, the better their health and the increased opportunities they have to move up the career ladder. The benefits associated with securing a good education, however, are not captured solely by individuals who have invested time in their human capital. Communities that strengthen their human capital stocks are better able to improve their economic competitiveness and expand their local economies.

With this as a backdrop, how has Indiana fared when it comes to the educational status of its adults residents over time? Figures 1 through 4 capture the educational patterns for Indiana adults 25 years of age and older since 1970. For

comparative purposes, trends for both U.S. and Indiana are included in our analysis. According to Figure 1, Indiana had just over 8 percent of its adult population with a baccalaureate degree or higher in 1970, about 2.4 percentage points lower than the U.S. figure. Since that time, the U.S./Indiana gap has been slowly widening. For example, differences between the U.S. and Indiana expanded to 4.7 percent in 1990, to 5 percent in 2000, and to 5.7 percent by 2015. The message is clear; Indiana is not producing, retaining

FIGURE 1

Percent of adults (25+ years of age) with a bachelor's degree or higher in the U.S. and Indiana, 1970-2015

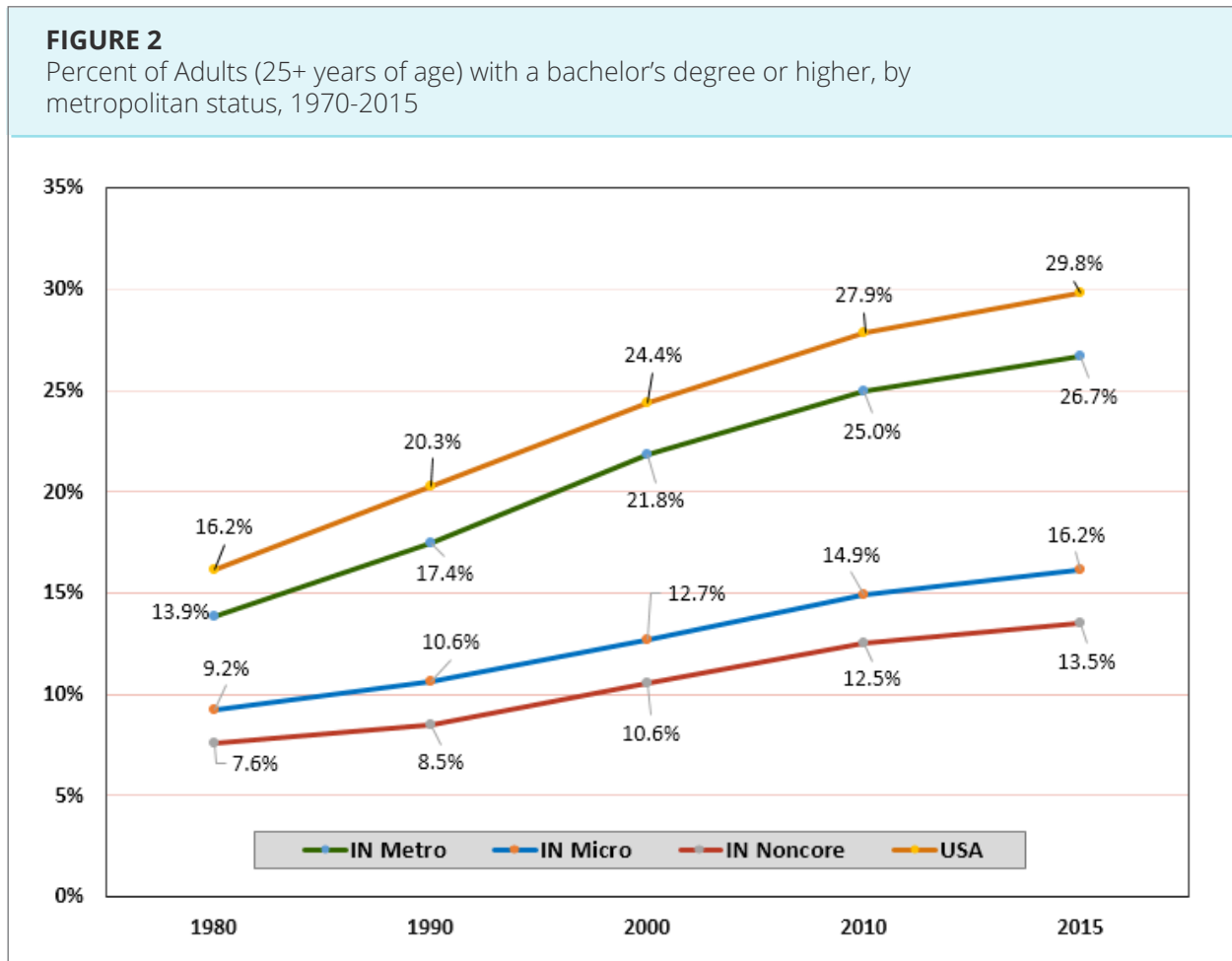


or attracting individuals at the same pace as the U.S. overall and has not done so over the course of the 45 years showcased in Figure 1.

A Look at the State's Best Educated Adults: Nonmetro Areas Not Keeping Pace!

We turn our attention to the distribution of Indiana's best-educated adults across its metropolitan and nonmetropolitan areas. In general, adults with higher levels of education are more inclined to reside in metropolitan areas since these location offer a wider array of job opportunities, better salaries/wages and greater amenities/services relative to nonmetro-based jobs. Is this the case in Indiana? The simple answer is yes!

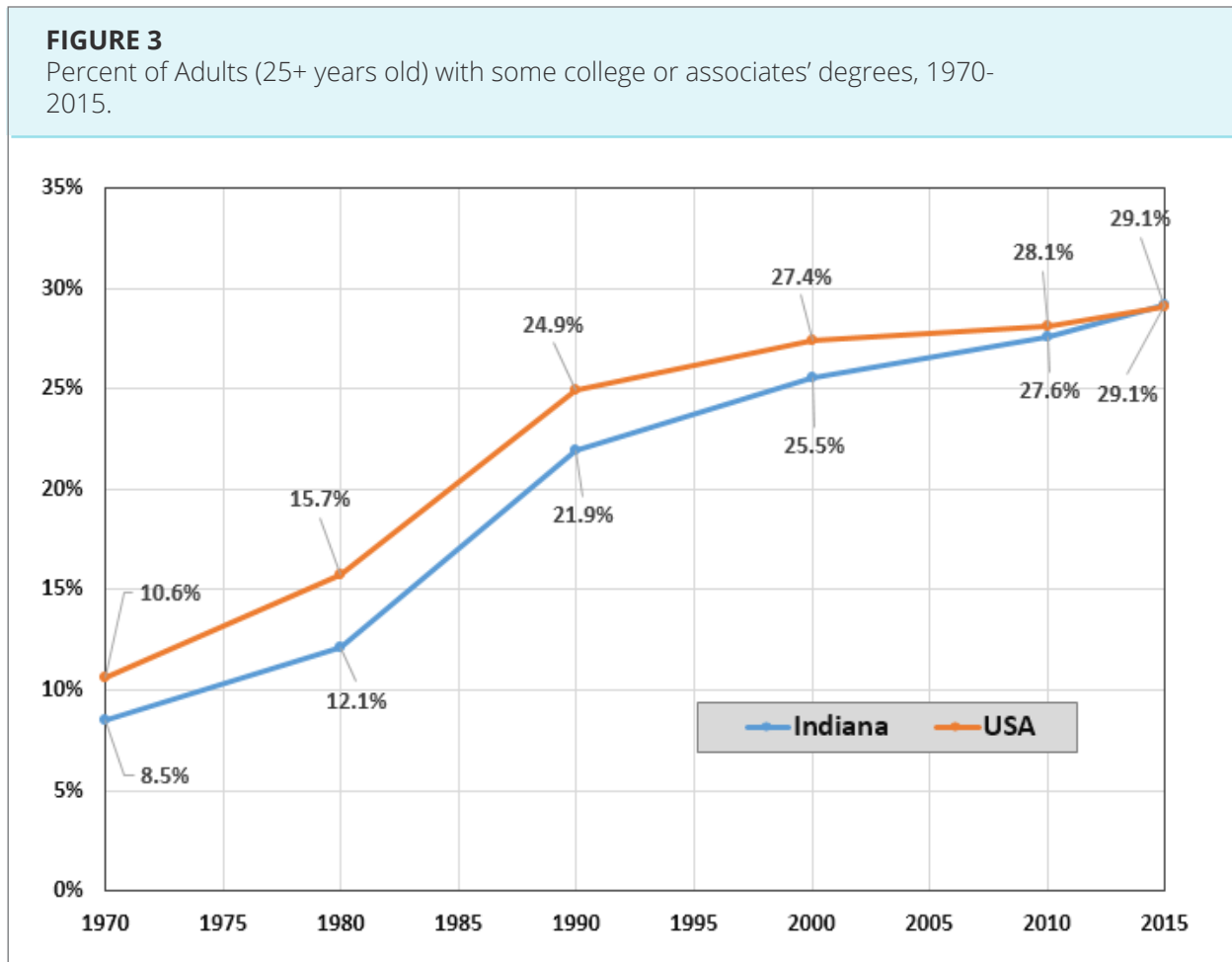
For purposes of our analysis, we adopt the 2013 definition of the United States Office of Management and Budget (OMB) with regard to counties designated as metropolitan, micropolitan and noncore (see the appendix for a description of the three county types). Analysis of the residential location of adult residents with a bachelor's degree or higher is displayed in Figure 2. It shows the following:



- The proportion of metro adults with a baccalaureate degree or higher in the state closely aligns with the U.S. figure. While still lagging behind the national trends, the gap between the U.S. and the state's metropolitan counties has grown at a very modest pace over time – from 2.3 percentage points in 1970 to 3.1 percentage points by 2015.
- The micropolitan-metropolitan education gap for Hoosiers with a bachelor's degree or higher has more than doubled between 1970 and 2015, from 4.7 to 10.5 percentage points.
- The proportion of noncore county-based adults with a baccalaureate degree or more is almost half the rate found in the state's metropolitan areas (13.5 percent for noncore counties versus 26.7 percent for metro counties).
- The gap in the proportion of adults with bachelors' degrees or more is less glaring between micropolitan and noncore counties of Indiana; 2.7 percentage points lower in noncore versus micropolitan counties in 2015.

Adults with Some College or Associate Degrees: A Brighter Picture for Indiana?

While the state has been unable to expand the cohort of higher educated Hoosiers at a rate comparable to the nation, its ability to grow or attract adults with “some college education or associate degrees” has improved significantly over time. As reported in Figure 3, Indiana was 2.1 percentage points behind the U.S. in 1970 when it came to adults with some college education or associate degrees. In fact, less than 9 percent of Hoosiers had achieved this level of education by 1970. Over time, the proportion of the state’s adults falling into this educational grouping undertook an upward trajectory. By 2015, the percentage of Indiana adults (25 years of age and older) with some college or a completed associate degree was virtually identical to the U.S. rate of 29.1 percent. Worth noting, however, is that the lion’s share of adult Hoosiers falling into an educational category completed some type of post-secondary coursework but never completed an associate degree.⁷



When it comes to the distribution of adults with some college education or an associate degree across the state’s metro/nonmetro landscape, the situation for the two nonmetro categories (micropolitan and noncore) appears more promising. Since 1990, the state’s micropolitan and noncore counties have been able to close the gap relative to their metropolitan counterparts when it comes to retaining and attracting adults with some college or associate degrees. For example, while noncore counties in the state were 4.3 percentage points behind metro areas in 1980 on this educational attainment metric, the difference fell to 1.9 percentage points by 2015.

⁷ The U.S. Census did not report “associate degree” completers separate from the “some college” grouping until 1990. As of 2015, the percent of adults with an associate degree in Indiana was 8.2 percent.

RETURNS TO EDUCATION

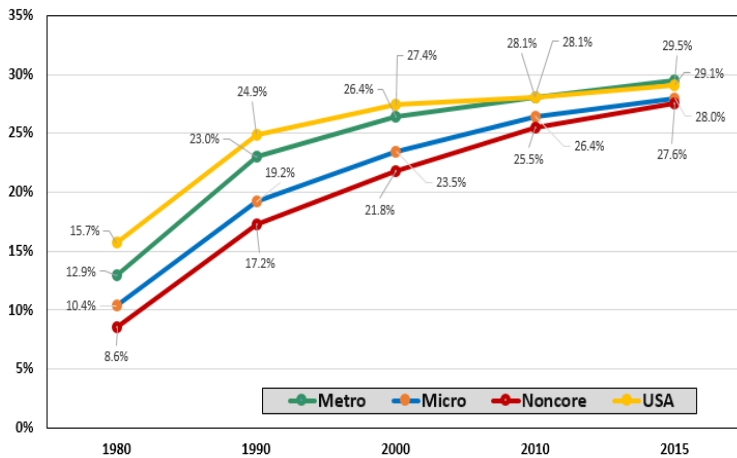
Studies have noted that individuals who invest in their formal education are able, over their careers, to increase their productivity and income.⁸ Figure 5 examines the median earnings of Hoosiers by their educational levels in 2010 and 2015 (note: all figures are adjusted to 2015 values).⁹ Without question, the income paid to adults with the best-education are considerably higher than those completing less education.

In 2015, for example, adults with a graduate or professional degree garnered a median income of just over \$60,000 annually while those with a terminal high school education had median earnings that were 52 percent lower. Without question, the pattern shown in Figure 5 makes clear that the higher a person's education, the higher their median earnings.

How do median earnings differ by gender? According to Table 1, regardless of one's educational level, median earnings for men 25 years of age and higher are consistently higher than those of women (as of 2015). The earnings disparities are higher among those with a high school education or less and smaller (but still sizable) for those with bachelors' degrees or graduate/professional degrees. The gap between men and women may be due to a number of factors. For one, men and women in Indiana may be employed in occupations that have different salaries/wages associated with them – with women being more likely to be employed in lower-paying occupations.¹⁰ Second, women are more likely to temporarily leave or reduce their hours in the workforce to take care of parenting or other family responsibilities (such as caring for elderly parents). When they opt to return to full time work, they face what some have labeled the “motherhood penalty.” A recent American Association

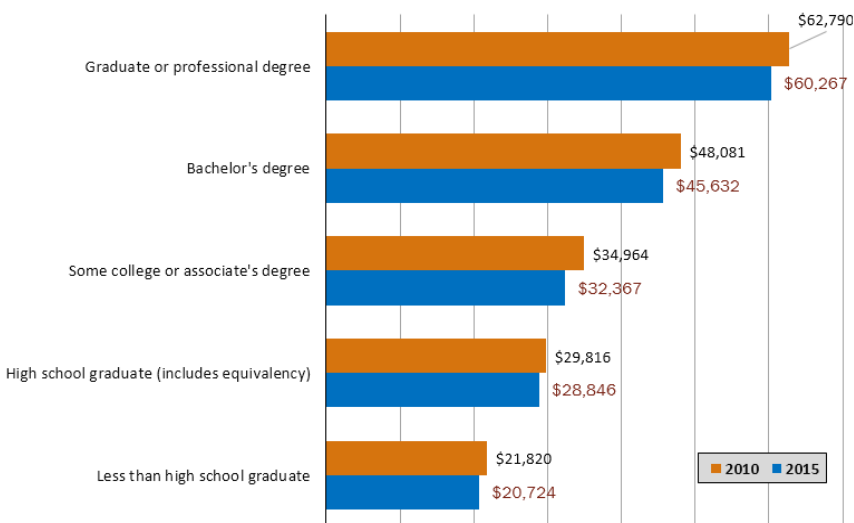
of University Women (AAUW) study states that a third factor is gender bias and discrimination in some workplaces.¹¹

FIGURE 4
Percent of Adults (25+ years old) with some college or associate degrees by metropolitan status, 1970-2015.



than those of women (as of 2015). The earnings disparities are higher among those with a high school education or less and smaller (but still sizable) for those with bachelors' degrees

FIGURE 5
Median Earnings by Educational Attainment, 2010 & 2015.



or graduate/professional degrees. The gap between men and women may be due to a number of factors. For one, men and women in Indiana may be employed in occupations that have different salaries/wages associated with them – with women being more likely to be employed in lower-paying occupations.¹⁰ Second, women are more likely to temporarily leave or reduce their hours in the workforce to take care of parenting or other family responsibilities (such as caring for elderly parents). When they opt to return to full time work, they face what some have labeled the “motherhood penalty.” A recent American Association

of University Women (AAUW) study states that a third factor is gender bias and discrimination in some workplaces.¹¹

⁸ Weiss, 1995; Woodman, 2003

⁹ The median earnings reported means that 50 percent of the people in this education category earned more than this amount and 50 percent earned less.

¹⁰ Shauman, 2006.

¹¹ See “The Simple Truth about the Gender Pay Gap”, American Association of University Women. (Spring 2017) at: http://www.aauw.org/aauw_check/pdf_download/show_pdf.php?file=The-Simple-Truth

TABLE 1

Median Earnings by Educational Attainment and Gender, 2015

| Education Level | Men | Women | Difference |
|---|-----------|-----------|-----------------|
| Less than high school graduate | \$ 26,276 | \$ 15,274 | \$ 11,002 (42%) |
| High school graduate (includes equivalency) | \$ 37,866 | \$ 21,957 | \$ 15,909 (42%) |
| Some college or associate degree | \$ 45,135 | \$ 26,531 | \$ 18,604 (41%) |
| Bachelor's degree | \$ 60,010 | \$ 37,861 | \$ 22,149 (37%) |
| Graduate or professional degree | \$ 75,894 | \$ 51,907 | \$ 23,987 (32%) |

Source: ACS 5-Year, 2011-2015 and 2006-2010

BRAIN GAIN CHANGES IN INDIANA

The brain drain, the out-migration of young educated talent to other places in the state or to other parts of the United States, remains a significant issue in many counties in Indiana. The factors that are motivating such moves vary, but include a desire to live in places with stronger economies, greater job opportunities, higher earnings potential, a larger array of social and cultural amenities, and accessibility to a higher density of well-educated people.¹²

To determine if counties in the state are making progress in retaining and attracting adults with some form of post-secondary education, we examined which Indiana counties are expanding their cohort of educated adults at a rate comparable to that of the nation, and which ones are failing to keep pace. Our analysis focuses on the two educational groupings that have served as the central focus of this paper, namely, adults 25 years of age or older with a bachelors' degrees and higher, and those with some college education/associate degrees. We conducted a shift-share analysis to generate the information needed to examine how successful Indiana has been in strengthening its human capital resources over time vis-à-vis the United States.

Shift-share analysis typically disaggregates job changes in a region (such as jobs growth) into the national, sectoral and regional effects. We employ a similar analysis but with educational attainment in Indiana as the central item of interest. As such, we explore the extent to which changes in the two educational groups (bachelor's education or higher and those with some college/associate degree) can be attributed to national trends (which refers to the expected change in Indiana) and which are due to county specific effects.

The results of our analysis are reported in Table 2 by the three Indiana county typologies – those classified as metropolitan, micropolitan and noncore areas. The top portion of Table 2 focuses on Hoosiers with the highest level of education while the bottom portion examines adult residents with some college/associate degrees. As shown in the table, over 567,000 metro-based adult residents in the state now have bachelors' degrees or more (as of 2015). Had the adult educational attainment rate in Indiana grown at the same pace as that of the nation between 1990 and 2015 (+94.8 percent), Indiana's metropolitan areas would have increased its pool of best-educated Hoosiers by over 432,000. In reality, it added just under 112,000, resulting in a deficit of more than 320,000 adults with baccalaureate degrees or more. As for micropolitan counties, the actual growth of their best-educated adults is a fraction of what it would have been had it grown at the national rate. Moreover, noncore counties are nearly 19,000 short of what our shift-share analysis shows would be needed to remain on par with the national attainment rate.

¹² Fiore et al., 2015; Foston and Hall, 2014; Wu and Gopinath, 2008.

The lower panel of Table 2 focuses on adult residents in the state with some college or associate degrees. Over the 1990–2015 span of time (25 years), the number of adults in the U.S. with this educational attainment expanded by 55.6 percent. How did Indiana fare relative to the nation on this metric? As of 2015, metropolitan areas of Indiana had nearly a million adults classified as having achieved this level of education. Metro areas realized a gain of over 381,000 adults in this educational cohort between 1990 and 2015. The metro figure is 47,374 higher than the national growth rate for this educational grouping. Similarly, micropolitan and noncore counties achieved gains in their “some college/associate degrees” groups at a rate higher than the U.S. trends. As such, there are forces at play in these counties that are helping them remain competitive when it comes to expanding the number of people with some college or associate degrees.

TABLE 2
Shift-Share Analysis of Indiana’s Educational Attainment, 1990-2015

| Metropolitan Status | Bachelor’s or higher, 2015 | National Share | Expected Change | Actual Change | Competitive Shift |
|---------------------|---------------------------------|----------------|-----------------|---------------|-------------------|
| Metro | 567,128 | 432,051 | 432,051 | 111,555 | -320,496 |
| Micro | 70,254 | 60,304 | 60,304 | 6,667 | -53,637 |
| Noncore | 27,365 | 22,553 | 22,553 | 3,584 | -18,969 |
| Metropolitan Status | Some college or associate, 2015 | National Share | Expected Change | Actual Change | Competitive Shift |
| Metro | 981,462 | 333,629 | 333,629 | 381,003 | 47,374 |
| Micro | 188,984 | 63,822 | 63,822 | 74,118 | 10,296 |
| Noncore | 86,415 | 26,724 | 26,724 | 38,318 | 11,594 |

Source: U.S. Census Bureau and Purdue Center for Regional Development

To gain a better understanding of what counties exceeded the national rate on terms of the growth of adults with bachelors’ degrees or more, or those with some college/associate degrees, we present results of the shift-share analysis for each of Indiana’s 92 counties. Map A (see Map A in appendix) indicates which counties have met or exceeded the growth of the best educated in the nation between 1990 and 2015, as well as those that have fallen short. Map B (see Map B in appendix) highlights which counties have met or exceeded the nation’s growth rate for those with some college/associate degrees and which counties failed to match the national rate.

A visual assessment of the two maps indicates that a majority of Indiana counties (i.e., 59 percent) failed to produce, retain or attract the best educated adults at a pace that aligns with the U.S. pattern. Specifically, only 37 of Indiana’s 92 counties were able to match or exceed the growth of adults with baccalaureate degrees or higher witnessed by the United States between 1990 and 2015. On the other hand, three of every four counties in the state matched or surpassed the U.S. growth of people with some college or associate degrees. Among counties that fell short on the baccalaureate degree or higher, several are clustered in the North Central, East Central and West Central regions of the state.

The expectation is that metropolitan areas would be the big winners when it comes to achieving an expansion of adults with bachelors’ degrees or more, and the results of our analysis appear to lend some support this argument. As Table 3 shows, over 48 percent of metropolitan counties matched or exceeded the U.S. rate in terms of growth of baccalaureate degree earners or more. This was followed by noncore counties at 34.8 percent, while micropolitan counties did the worse with 32 percent of these counties achieving or exceeding the national rate.

TABLE 3

Results of Shift-Share Analysis in Educational Attainment by Metropolitan Status in Indiana, 1990-2015

| Growth in Adults with Bachelors' Degrees +, 1990-2015 | Metropolitan | | Micropolitan | | Noncore | | Total | |
|--|--------------|---------|--------------|---------|---------|---------|--------|---------|
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Below U.S. Rate | 23 | 52.3 | 17 | 68.0 | 15 | 65.2 | 55 | 59.8 |
| At/Above U.S. Rate | 21 | 47.7 | 8 | 32.0 | 8 | 34.8 | 37 | 40.2 |
| Growth in Adults with Some College or Associate Degrees, 1990-2015 | Metropolitan | | Micropolitan | | Noncore | | Total | |
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Below U.S. Rate | 10 | 22.7 | 8 | 32.0 | 3 | 13.0 | 21 | 22.8 |
| At/Above U.S. Rate | 34 | 77.3 | 17 | 68.0 | 20 | 87.0 | 71 | 77.2 |

Source: U.S. Census Bureau and Purdue Center for Regional Development

When we shift to examining the growth of adults with some college or associate degrees, all counties, regardless of their metropolitan status, did better than the national growth rate of 55.6 percent. Overall, 87 percent of noncore counties met or exceeded the U.S. rate closely followed by metropolitan (77.3 percent) and micropolitan (68 percent) counties. An important caveat is that given the smaller populations living in noncore counties, it would be easier to achieve a higher rate of growth than would be the case in metro areas where the population of adults 25+ years of age would be far more sizable. One more aspect to make note of is that we have used the 2013 OMB classification mentioned earlier in the report and applied the same specification from 1990 through 2015.

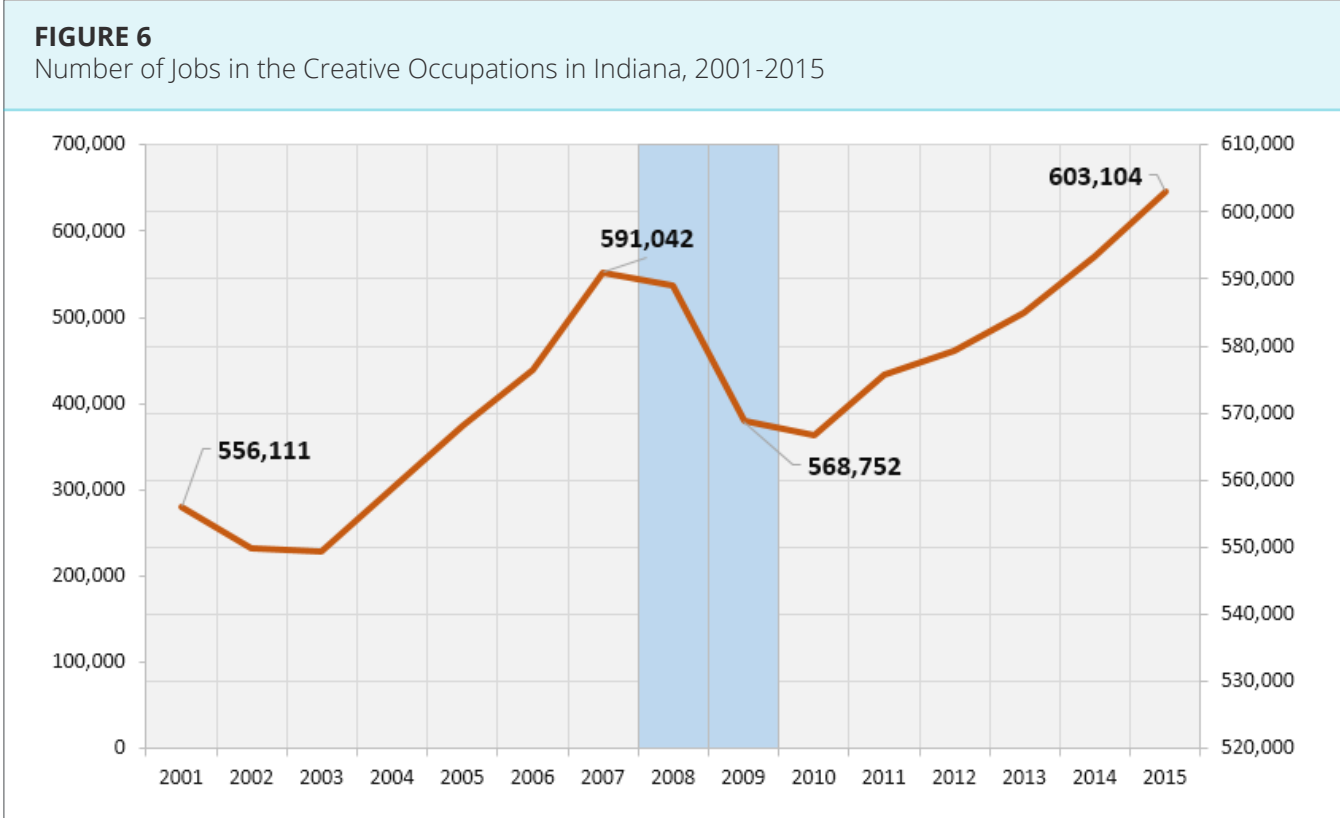
THE KNOWLEDGE-BASED ECONOMY: THE DEMAND FOR CREATIVE AND STEM WORKERS IN INDIANA

In his book, *The Rise of the Creative Class*, Richard Florida notes that knowledge and ideas serve as key catalysts for spurring economic growth. He argues that individuals employed in occupations that require a high level of creative problem solving, along with those engaged in artistic, cultural, and designer goods and services¹³, are part of what he labels the “creative class.” He identifies 22 major occupation categories as representing the core of the creative class. While his research gained favor with several state and local leaders across the nation, Florida’s argument that the creative class is, in large part, an attribute of the country’s metropolitan generated considerable controversy. To determine the presence of creative workers in nonmetropolitan areas, researchers with USDA’s Economic Research Service (ERS) fine-tuned and expanded Florida’s measure of creative occupations, combining a more extensive array of creative-type tasks. The result was the revision of the creative class measure that encompassed 165 five-digit Standard Occupational Classification (SOC) groups.¹⁴ To assess the demand for creative/knowledge-based workers in Indiana, we adopted the ERS measure of the creative class.

¹³ Rosenfeld, 2005

¹⁴ See McGranahan and Wojan, 2007 for a more thorough discussion of the methodology employed by ERS in the development of a more comprehensive measure of creative occupations. Five-digit SOC is the maximum granular classification for the occupations.

The number of jobs tied to the creative class in Indiana is presented in Figure 6. Data are provided over a 15-year period. Over 556,000 jobs in 2001 were associated with creative occupations. This grew to more than 591,000 jobs by 2007. However, the Great Recession that affected the country over the course of the 2008-09 period resulted in the loss of more than 24,000 creative-type jobs by 2010. Since that time, creative jobs have experienced steady growth, now exceeding the 603,000 mark (a 6.4 percent expansion over the past five years).



The information provided in Table 4 indicates that the largest share of creative jobs are located in Indiana’s metropolitan counties, consistent with Richard Florida’s assertion. On the other hand, over 92,000 creative jobs are located in the state’s nonmetro counties, primarily its micropolitan areas. This finding affirms the view of ERS researchers that the creative class is not an exclusive feature of metropolitan areas given that 16 percent of Indiana’s creative jobs are located in its nonmetro areas.

TABLE 4
Distribution of Creative Class Jobs in Indiana by Metropolitan Status, 2001-2015

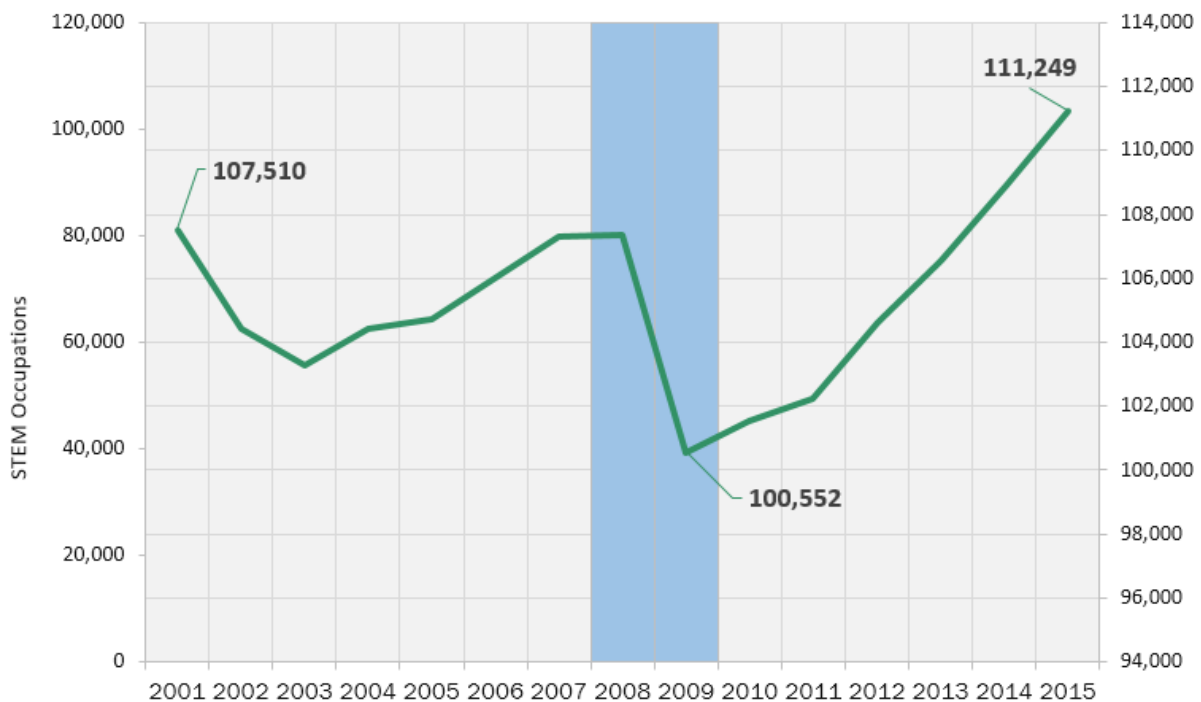
| Metro Status | 2001 | 2005 | 2010 | 2015 |
|--------------|---------|---------|---------|---------|
| Metropolitan | 448,316 | 461,695 | 464,046 | 493,670 |
| Micropolitan | 70,416 | 69,145 | 65,296 | 67,831 |
| Noncore | 24,977 | 25,196 | 25,249 | 25,290 |

Note: Some creative class jobs could not be distributed to counties by the Quarterly Census of Employment and Wages or by Economic Modeling Specialists International, the sources of our data. As a result, not all creative class jobs could be classified by their metro status. As such, the total number of jobs shown in this table will be less than the number reported in Figure 6.

Source: ERS, Purdue Center for Regional Development, Emsi 2016.4

FIGURE 7

Number of Jobs in STEM-Related Occupations in Indiana, 2001-2015



Drilling Down to STEM-Related Jobs

A smaller subset of jobs in the state are associated with occupations that are commonly referred to as “STEM-related” jobs. Both the Department of Commerce’s Economics and Statistical Administration (ESA), along with the National Science Foundation, have identified 68 five-digit Standard Occupational Codes associated with jobs in science, technology, engineering and mathematics. We adopt this classification system for assessing the size of STEM-related jobs in Indiana.

FIGURE 8

Distribution of STEM Jobs in Indiana by Metro/Nonmetro Counties, 2015

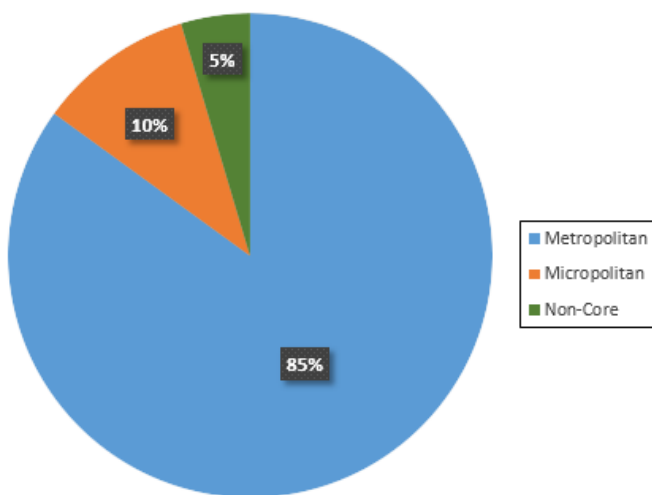


Figure 7 tracks the growth and decline of STEM-related jobs in the state over the period of 2001 through 2015. At the beginning of the new millennium (i.e., 2001), nearly 108,000 STEM jobs existed in the state. However, a decline in STEM positions occurred during the Great Recession, bottoming out to 100,552 jobs in 2009. Since that time, STEM jobs have been slowly increasing and have now surpassed the 111,000 mark. While the number of STEM-related jobs in Indiana is expanding, they currently represent about 3 percent of all jobs in the state. As for the geographic distribution of these jobs in 2015, 85 percent are located in the state’s metro counties, with only 15 percent present in the nonmetropolitan (i.e., micropolitan and noncore) areas of the state (see Figure 8).

TECHNOLOGY-RELATED OCCUPATIONAL CLUSTERS IN INDIANA

In this final section of paper, we examine a core set of “knowledge-intensive and technology-oriented” occupation clusters that require a higher order of thinking, knowledge and skills, and innovative capacity. We do so by creating occupation clusters, groups of occupations that share similar knowledge, skills and other key characteristics, such as formal education levels, knowledge domains, experience requirements, and salary/wage levels. Research has shown that occupation clusters are critical to the creation of a knowledge economy, so it is valuable to take a careful look at Indiana’s mix of occupation clusters that are reflective of high-tech, high-wage jobs.

Six technology-related clusters were constructed by the Purdue Center for Regional Development. However, in light of the importance of the manufacturing sector to Indiana’s economy, a seventh cluster was produced, one that focuses on production-oriented workers. Table 5 presents information on the number of people engaged in these seven occupation clusters at two points in time – 2001 and 2015. The good news is that five of the six technology-oriented occupation clusters have experienced a healthy expansion over the past 15 years. The largest number of net new jobs were associated with the post-secondary education professional/knowledge creation cluster (+8,990 jobs), followed by Information Technology (+5,943) and doctors/surgeons (+5,820) clusters. Adding jobs at a smaller pace were the natural sciences professionals (+962) and mathematicians/statisticians (+2,397). The only technology-related cluster suffering a decline between 2001 and 2015 was the Engineering cluster, registering a loss of nearly 3,400 jobs.

TABLE 5

Number of Workers Associated with Seven Occupation Clusters in Indiana, 2001-2015

| Technology-based Occupation Clusters | 2001 Jobs | 2015 Jobs | Change | % Change |
|---|-----------|-----------|---------|----------|
| Post-Secondary Education and Knowledge Creation | 34,321 | 43,301 | 8,980 | 26% |
| Medical Scientists and Practitioners | 29,068 | 34,888 | 5,820 | 20% |
| Information Technology | 55,768 | 61,711 | 5,943 | 11% |
| Natural Sciences & Environmental Management | 11,224 | 12,186 | 962 | 9% |
| Mathematics, Statistics, Data and Accounting | 65,036 | 67,433 | 2,397 | 4% |
| Engineering | 38,380 | 34,991 | -3,388 | -9% |
| Skilled Production-based Occupation Cluster | 302,971 | 280,826 | -22,145 | -7% |

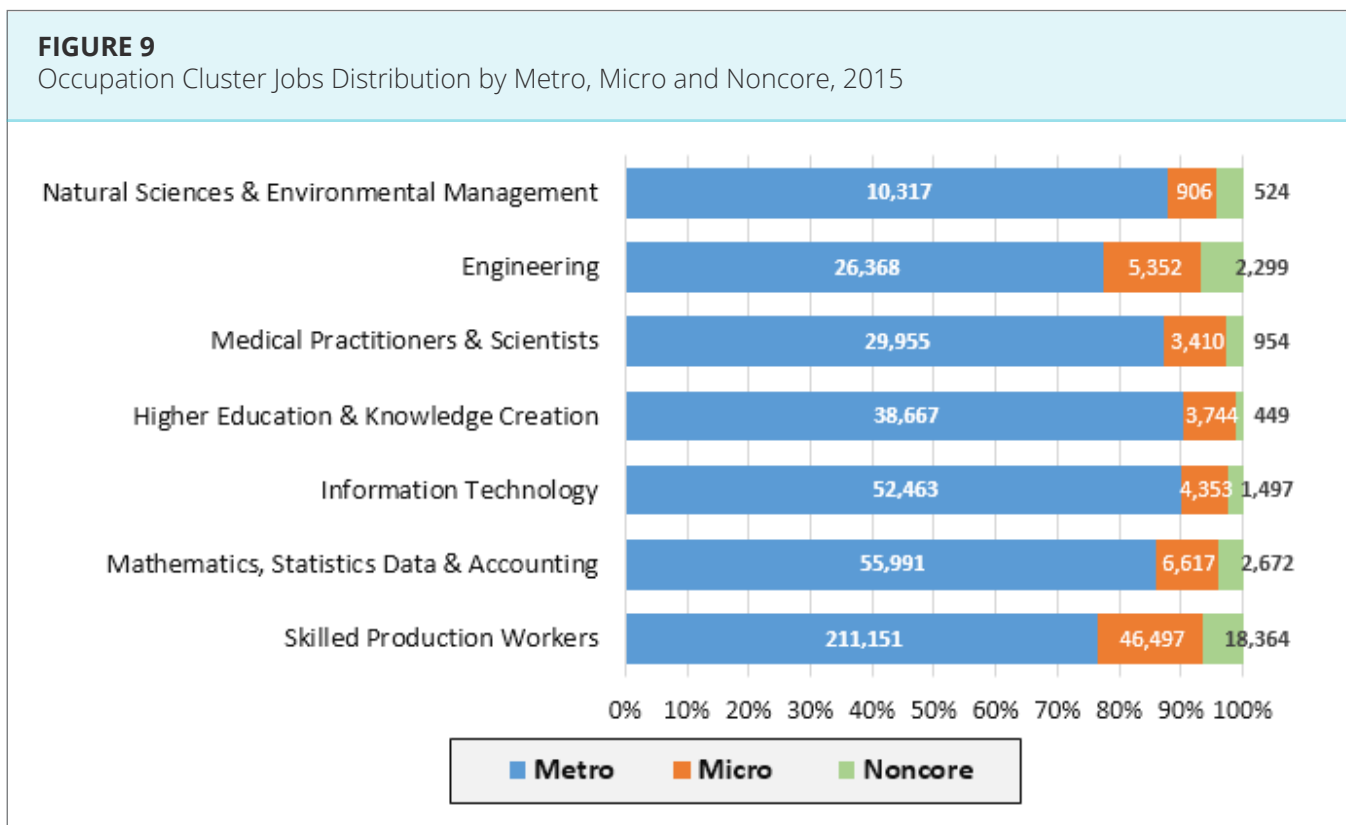
Source: Purdue Center for Regional Development, Emsi 2016.4

A seventh occupational cluster we explore is the “Skilled Production-based Occupation Cluster” since it relates to jobs that are more oriented to Indiana’s middle-skilled workforce. As Table 5 reveals, this is a sizable sector in terms of jobs, representing more employees than those associated with the technology-based occupation clusters combined. While the state has been a national leader when it comes to the health of its manufacturing and other production-related activities, the reality is that the number of people engaged in this work has declined over the course of the past 15 years by over 22,000 jobs. What factors are behind these declines? Is it global competition, displacement of workers due to automation, the inability to have a strong pipeline of skilled workers or other factors? These are the key issues that warrant further attention if Indiana hopes to remain a national leader in manufacturing.

Occupation Clusters: Distribution by Metropolitan Status

Most people familiar with the technology-based jobs would note that the lion's share of these jobs are likely to be located in major metropolitan areas of the country. Without question, high-tech, high growth jobs often cluster in larger cities since they provide companies with access to a larger pool of people with the requisite education, skills and experiences. At the same time, these places offer workers with the mix of services and amenities that they are looking for when it comes to a place to live.

Figure 9 provides a snapshot of the distribution of the seven occupation clusters across the state's metropolitan, micropolitan and noncore counties. Overall, it is clear that Indiana's metropolitan areas serve as the hub for the six technology-based occupation clusters, as well as the skilled production-based occupation cluster. But what is worth noting is that nonmetropolitan areas of the state – be they micropolitan or noncore counties – have been also able to capture their share of workers with the education, knowledge and skills necessary to be gainfully employed in some of the technology and production-oriented jobs.



Note: Some jobs could not be distributed to specific counties either by the Quarterly Census of Employment and Wages or by Economic Modeling Specialists International. As such, these jobs could not be assigned metro, micro or noncore status. These jobs vary by as many as 4,814 jobs for skilled production workers to 353 jobs in higher education and knowledge creation occupation clusters.

Three technology-based clusters appear to be based primarily in metropolitan areas of Indiana – Higher Education & Knowledge Creation, Information Technology and Natural Sciences and Environmental Management. Some of the state's largest public and private institutions are located in larger populated areas of the state, so the results of this cluster should not be surprising. Nor should anyone be shocked by the dominance of the Information Technology cluster in metropolitan-based counties given that the infrastructure needed to support these jobs are more likely to be found in more populated, higher density areas. What may be confusing to some is the sizable number of jobs in metro areas associated with Natural Science and Environmental Management. Certainly, some of these jobs are more likely to be found in less populated areas of the state, but the bulk of positions associated with environmental management are likely to present in larger, more metropolitan-based counties.

While still largely confined to metro counties, Medical Practitioners and Scientists, along with Mathematicians, Statistics Data & Accounting occupations, are found in nonmetro areas of the state as well, although the tendency is for these jobs are to be located in Indiana's micropolitan rather than noncore counties. Where micropolitan and noncore counties tend to have a more sizable role is in the Engineering and Skilled-Production occupation clusters. Better than 20 percent of all jobs associated with these two clusters are located in the nonmetropolitan areas of Indiana – both in micropolitan and micropolitan counties. These results affirm the fact that nonmetro areas of the state are important players when it comes to production-oriented jobs – especially those associated with the manufacturing sector. Furthermore, production-oriented work requires access to engineers and that is why the engineering cluster has such a significant presence in these less populated areas of the state.

Worth noting is the continued significance of production-oriented jobs in the state. Despite the decline in jobs related to this occupation cluster since 2001, the fact remains that over 280,000 jobs are part of this cluster. Furthermore, nearly 55,000 production-oriented workers are located in micropolitan and noncore counties of the state, more than the total jobs in 2015 associated with the four technology-oriented occupation clusters.

CONCLUDING COMMENTS

Recent economic data show that Indiana has made significant strides in rebounding from the economic woes that beset the state during the Great Recession of 2007-2009. With a March 2017 unemployment rate of 3.9 percent and the addition of more than 45,000 jobs over the past 12 months, there is reason to be optimistic about the health of the state's economy.

What this report has tried to do, however, is examine a core set of data that might provide valuable insights into the troubles that may lie ahead in Indiana's quest to be a major national and global economic player. The ability of the state to achieve social and economic progress over the long-term will rest, in part, on its capacity to produce, retain and attract talent. Nevertheless, ramping up its supply of educated and skilled workers will not be enough. Of equal importance will be the need to accelerate the number of quality jobs that can help stem the outflow of talent to the other parts of the U.S. and beyond.

Though it was never our intent to pursue an exhaustive examination of talent and jobs in the state, our analysis does offer the opportunity to outline the challenges that lie with regard to talent and jobs in Indiana. The set of concerns include the following:

- **Best Educated Adult Hoosiers: Falling Behind the Nation:** In a globally competitive marketplace, having an growing number of adults in the state with bachelors' degrees or higher will be important, especially if Indiana hopes to expand the number of high-tech, high-skilled jobs. Unfortunately, the state continues to lose ground in terms of keeping pace with the U.S. in terms of the proportion of adults with baccalaureate degrees or higher.
- **The Number of "Some College/Associate Degree Holders" is Large. . . But Deceptive:** While Indiana lagged behind the nation by 3 percentage points in 1990 in terms of the proportion of adult Hoosiers with some college education or a completed associate degree, it has now matched the national figure of 29.1 percent. However, these gains can be misleading. The reality is that the percent of adults in the state with a completed associate degree stands at 8.2 percent (as of 2015). Thus, most adults that fall into the educational category of "some college/associate degree" are comprised of individuals who have completed some college or technical education courses, but have no formal associate degree. In order to meet the needs of employers whose are seeking workers with middle-to-higher order skills, it will be essential to expand the number of adult Hoosiers with an associate degree.

- **Knowledge/Creative Workforce is Expanding:** Over 603,000 adults in the state are employed in knowledge/creative-based jobs, representing about 20 percent of the nonfarm employed workforce in 2015. While most are located in the state's metro areas, about one of every six persons engaged in knowledge/creative occupations in the state is employed in nonmetropolitan areas of the state. It will be important for state, regional and local economic development leaders and agencies to recognize that a knowledge/creative workforce is not confined to metro areas of the state.
- **STEM-Related Occupations: Growing, But Still Limited in Size:** Several STEM education-related initiatives are being advanced by school systems, higher education institutions and state government agencies in Indiana for the purpose of expanding the pipeline of youth and young adults pursuing STEM-related programs and careers. Such investments make sense in light of a 2015 report by the National Science Foundation that states, "To ensure continued U.S. competitiveness and prosperity, our Nation must foster a strong, STEM-capable workforce."¹⁵ Our analysis shows that just over 111,000 jobs in Indiana are associated with the 68 occupations that the Economic and Statistics Administration/U.S. Department of Commerce and National Science Foundation has identified as STEM-related jobs. Expanding the number of people with STEM-related training will be a key factor in positioning the state to be an active player in the 21st century economy. However, the ability to retain these STEM graduates will be dependent upon Indiana's capacity to accelerate the number of STEM-related jobs available to these graduates.
- **Returns to Education: Gender Disparities across the Board:** It is a well-established fact that one's education has a direct bearing on his/her lifetime earnings. As our report affirms, education matters when it comes to the median earnings captured by employed Hoosiers. The 2015 median earnings for men with graduate or professional degrees were two times higher than for men with a high school education only. The differential was nearly 2.4 times higher for women with graduate/professional degrees versus women with high school degrees only. Worth noting, however, is the sizable disparity in median earnings between men and women – irrespective of the level of education completed. For example, employed women in the state with bachelors' degrees had median earnings that were 37 percent lower than that of men with the same level of education. The disparity for men versus women with graduate or professional degrees was 32 percent. While there are many factors that could be contributing to the median earnings gap, it is an issue that employers will need to address if they hope to attract and retain women to be part of their workforce.
- **Technology-Based vs. Production-Based Jobs: Balanced Investment Essential:** While the cry for a STEM and knowledge/creative-based workforce continues to be heard, it is important to keep sight of the fact that Indiana remains tied to manufacturing and other production-based activities. While some of these jobs require people with four-year college degrees or higher, many demand individuals with strong middle-skilled training and experiences. It will be important for the state to pursue a balanced portfolio of economic development activities, one designed to grow STEM and other technology-based jobs, while simultaneously investing in innovative strategies to keep its production-based industries globally competitive.¹⁶
- **Nonmetropolitan Indiana Must Not be Forgotten:** Our report paints a mixed picture regarding the state of Indiana's nonmetropolitan (micropolitan and noncore) counties. On a positive note, about 15 percent of STEM jobs and 16 percent of knowledge/creative positions are located in the nonmetro areas of the state – facts that

¹⁵ See Revisiting the STEM Workforce. Report of the National Science Board of the National Science Foundation. February 4, 2015. <https://www.nsf.gov/nsb/publications/2015/nsb201510.pdf>

¹⁶ The STEP occupations that we include in our analysis is based on a stringent list of occupations delineated by the U.S. Department of Commerce and the National Science Foundation. The Brookings Institution has made the case that STEM jobs should not be limited to occupations requiring people with bachelor's or higher levels of education. They note that several jobs requiring technical skills involve the application of STEM knowledge. Furthermore, many of these positions require individuals with technical training and associates' degrees.

may go unnoticed on the part of state economic development agencies and leaders. Moreover, nearly 1 in 4 skilled production jobs are located in nonmetro areas, and 22 percent of PCRDR's engineering cluster jobs are held by people working in nonmetro areas. Of concern, however, is the lower educational attainment among adults living in nonmetro Indiana. Our data show that the gap between metro and nonmetro counties in terms of the proportion of adults with a bachelors' degree or higher is sizable. Although nonmetro areas have achieved some success in increasing the proportion of adults with some college or associate degrees, only a fraction of these individuals have completed their associate degree. As such, it will be important for the state to work on expanding economic development investments in nonmetro areas of Indiana, but the success of these efforts will depend over the long-term on accelerating the number of adults in these counties with formal associate and baccalaureate degrees.

DATA SOURCES FOR FIGURES

Figure 1: U.S. Census Bureau, Economic Research Service (ERS), USDA; National Historical Geographic Information System (NHGIS), Purdue Center for Regional Development (PCRD), Waldorf 2006.

Figure 2: Ibid.

Figure 3: Ibid.

Figure 4: Ibid.

Figure 6: ERS, PCRD, Emsi (Economic Modeling Specialists International) 2016.4

Figure 7: ERS, PCRD, Emsi 2016.4

Figure 8: PCRD, Economics and Statistics Administration (ESA), National Science Foundation (NSF), Emsi 2016.4

Figure 9: PCRD, Emsi 2016.4

APPENDIX

Metropolitan Status: An Overview

A **metropolitan (or metro) area** refers to central counties with one or more “urbanized areas” of 50,000 persons or more, as well as outlying counties that have strong economic ties to the central counties. Outlying counties are deemed to be part of a metro area if they have 25 percent or more of their employed workforce commuting to the central county, or if 25 percent or more of the outlying county’s employed labor force is made up of commuters from the central city.

Nonmetropolitan counties, on the other hand, can be classified into one of two groups – micropolitan or noncore. Micropolitan counties have one or more urban clusters of 10,000 to 49,999 persons, as well as outlying counties with 25 percent or more of their employed population commuting either to the central micropolitan county or from the micropolitan county to the outlying county.

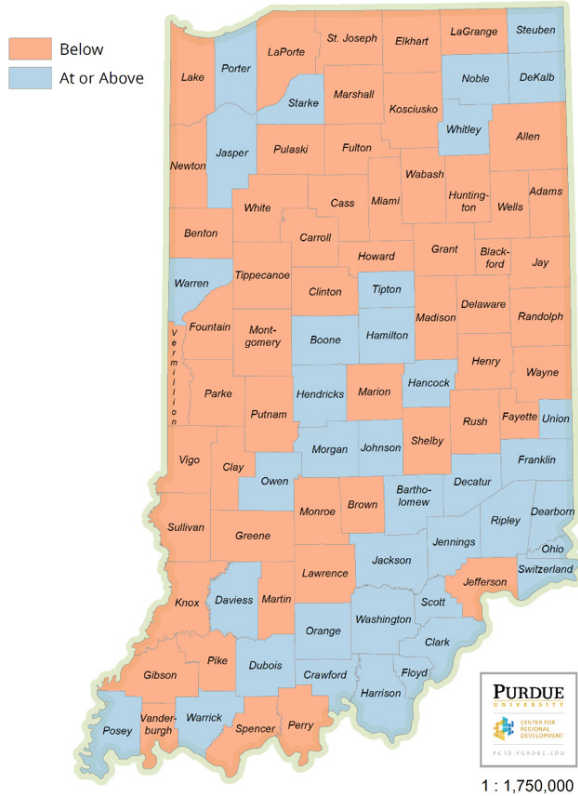
The Noncore label is assigned to nonmetropolitan counties that fail to meet the micropolitan definition. As such, they are counties that have no city, town or urban cluster of 10,000 residents or more. Thus, cities and towns that are part of noncore counties are typically small in population size, oftentimes just a few thousand people or less.

The distribution of Indiana counties by the metropolitan/nonmetropolitan area classification is as follows (based on 2013 data): Metropolitan: 44 counties; Micropolitan: 25 counties; Noncore: 23 counties.

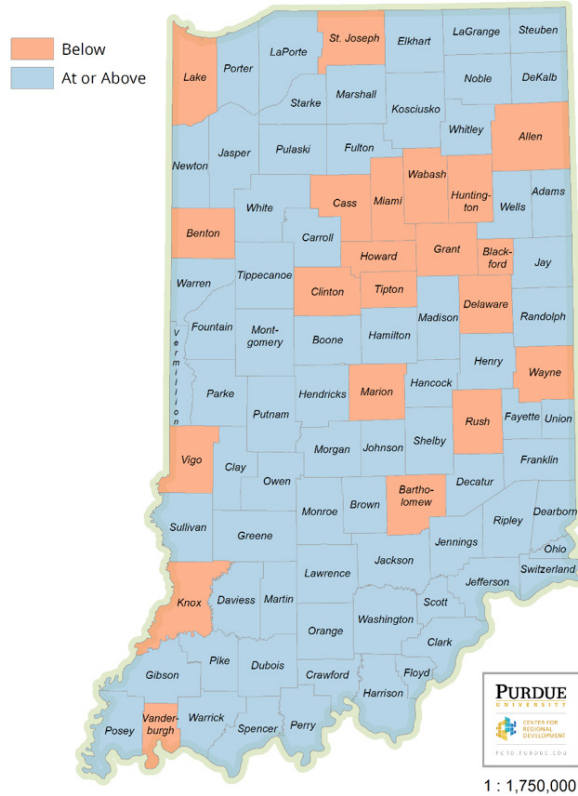
MAPS A & B

Referenced on page 8

MAP A: Bachelors' Degree or Higher



MAP B: Some College & Associate Degree



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Appendix 6

Presentation Slides

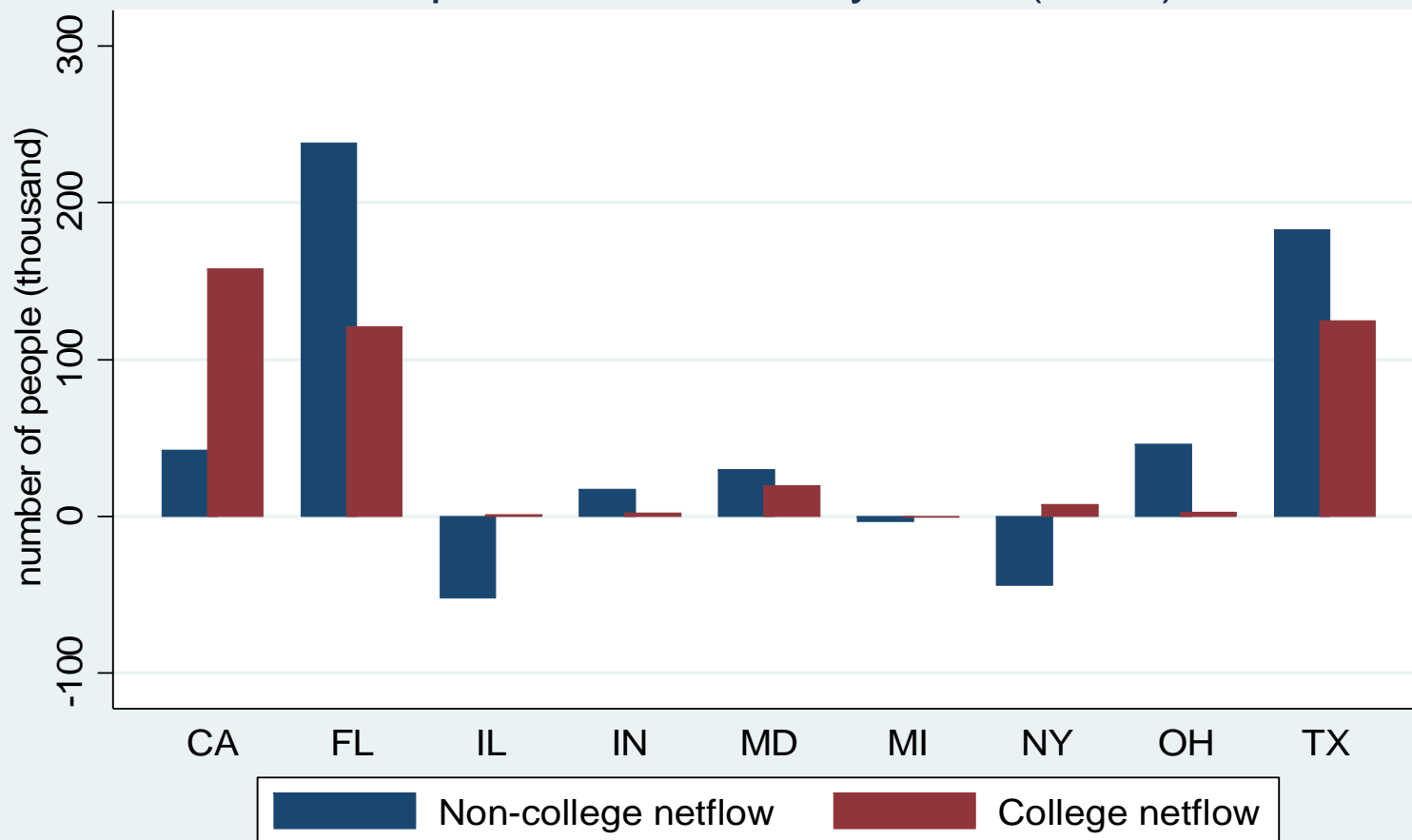
Dr. Kevin Mumford

**Indiana's Talent Gap and Brain Drain/Gain Workshop—
Making Indiana a Magnet for Jobs and Talent:
Indiana Workers – where do they come and where do they go?**

Economics Department, Purdue University

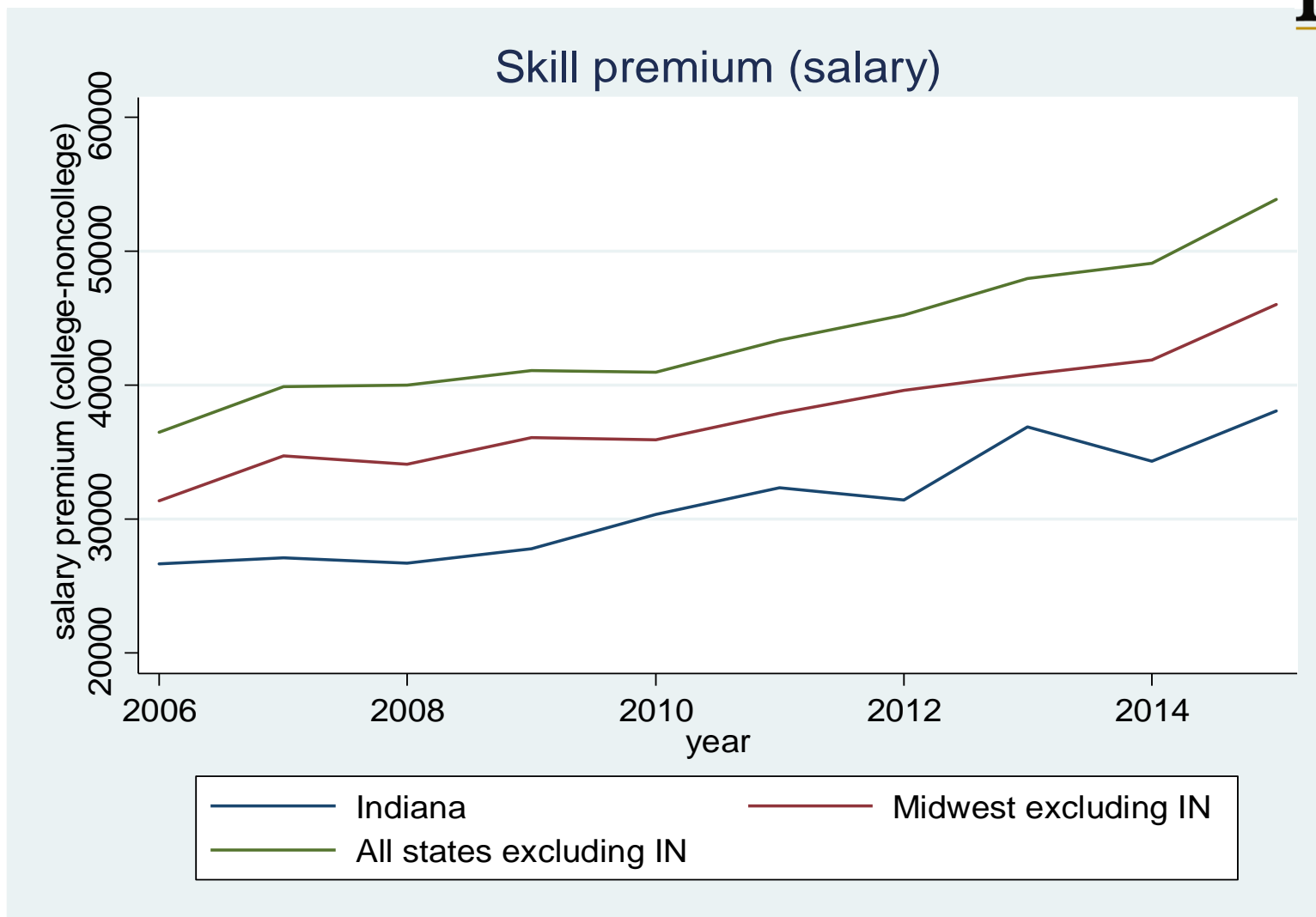


Population Netflow by State (2015)



Note: >0: inflow; <0: outflow



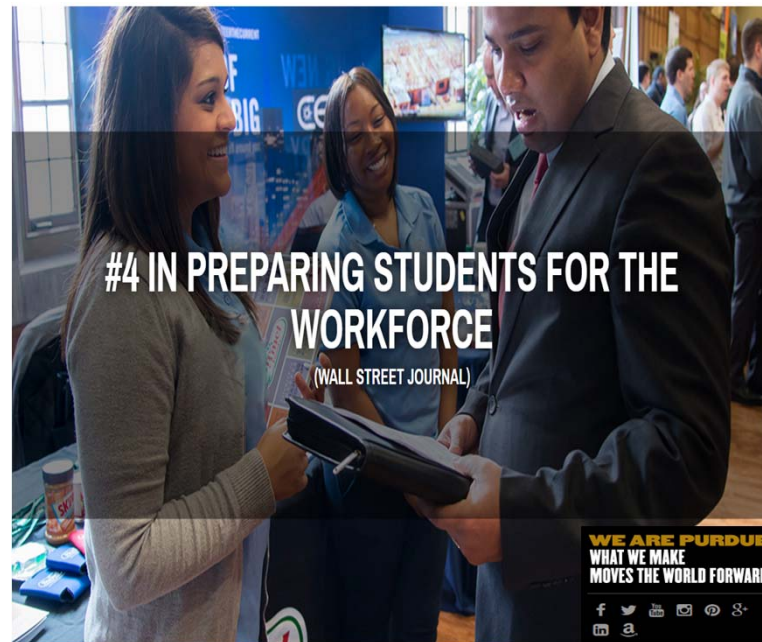


Source: American Community Survey (ACS, 2015)



Purdue College Graduates Staying Rate in IN

- **In-state Students**
 - Stay **60.70%**
 - Leave 39.30%
- **Out-of-state Students**
 - Stay **11.96%**
 - Leave 88.04%
 - (54.81% Home State)
- **International Students**
 - Stay **16.43%**
 - Leave 83.57%



Staying Rate by STEM Occupations

STEM

| | | |
|--------------------------|-------------|--------------|
| ▪ In-state Students | Stay 52.40% | Leave 47.60% |
| ▪ Out-of-state Students | Stay 10.93% | Leave 89.07% |
| ▪ International Students | Stay 15.00% | Leave 85.00% |

Non – STEM

| | | |
|--------------------------|-------------|--------------|
| ▪ In-state Students | Stay 66.19% | Leave 33.81% |
| ▪ Out-of-state Students | Stay 13.17% | Leave 86.83% |
| ▪ International Students | Stay 18.28% | Leave 81.72% |



Staying Rate Varies Largely by Occupations

(Example: In-state Students, with average GPA)

- **Social Worker** (207 IN students)
 - Stay 94.2%, GPA 3.13
 - Leave 5.8%, GPA 3.30

- Elementary School Teacher (585 IN students)
 - Stay 84.3%, GPA 3.44
 - Leave 15.7%, GPA 3.46

- Software Applications Developer (226 IN students)
 - Stay 38.5%, GPA 2.94
 - Leave 61.5%, GPA 3.08

- **Chemical Engineer** (204 IN students)
 - Stay 26.5%, GPA 3.03
 - Leave 73.5%, GPA 3.18



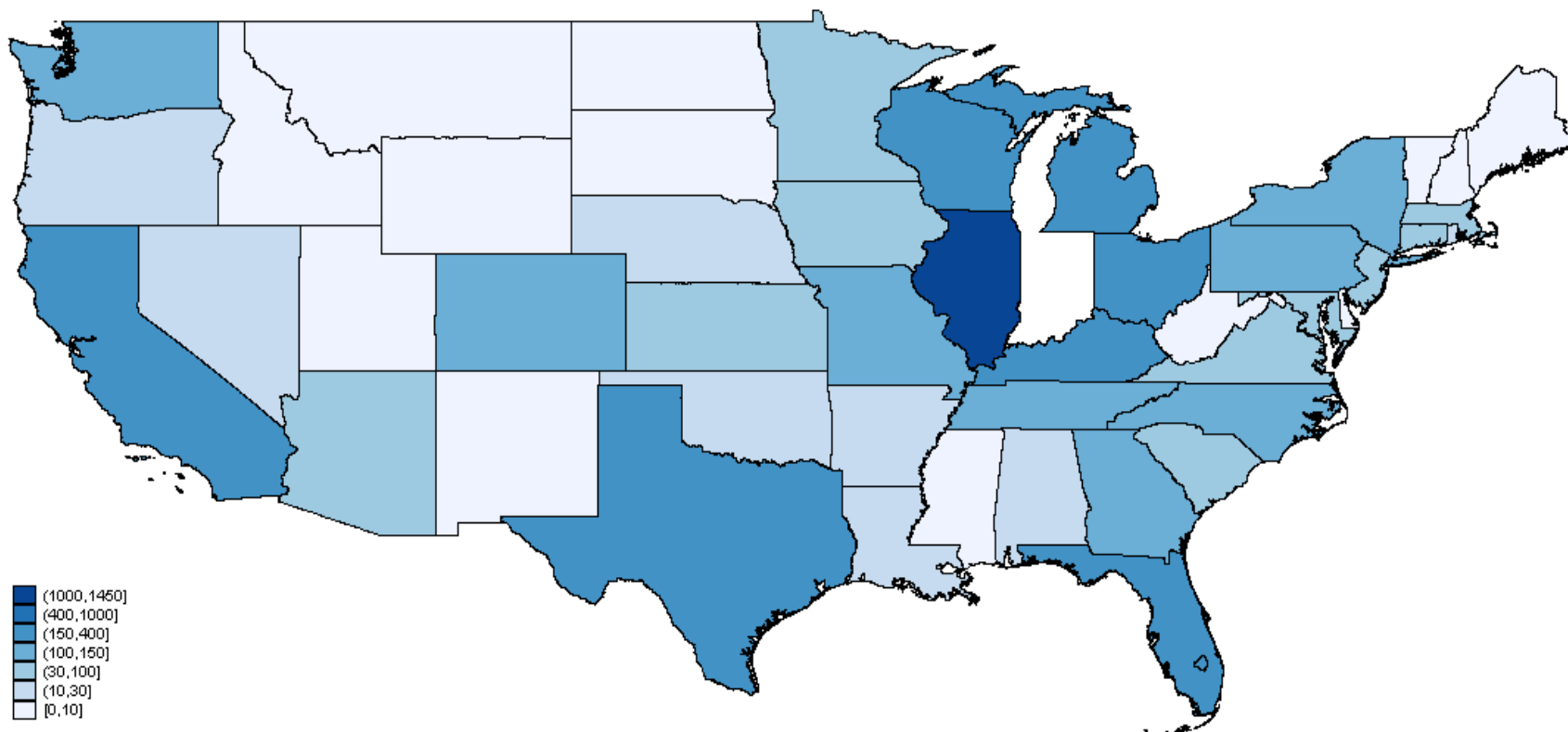
Who are more likely to stay?

- Female students are more likely to choose high staying rate major, such as Early Childhood Education.
- Students who stayed on average had lower SAT math scores and lower college GPA than those who left.



4930 In-State students (39.30% of all In-State students) left IN after graduation

Where do IN students go, if they leave?

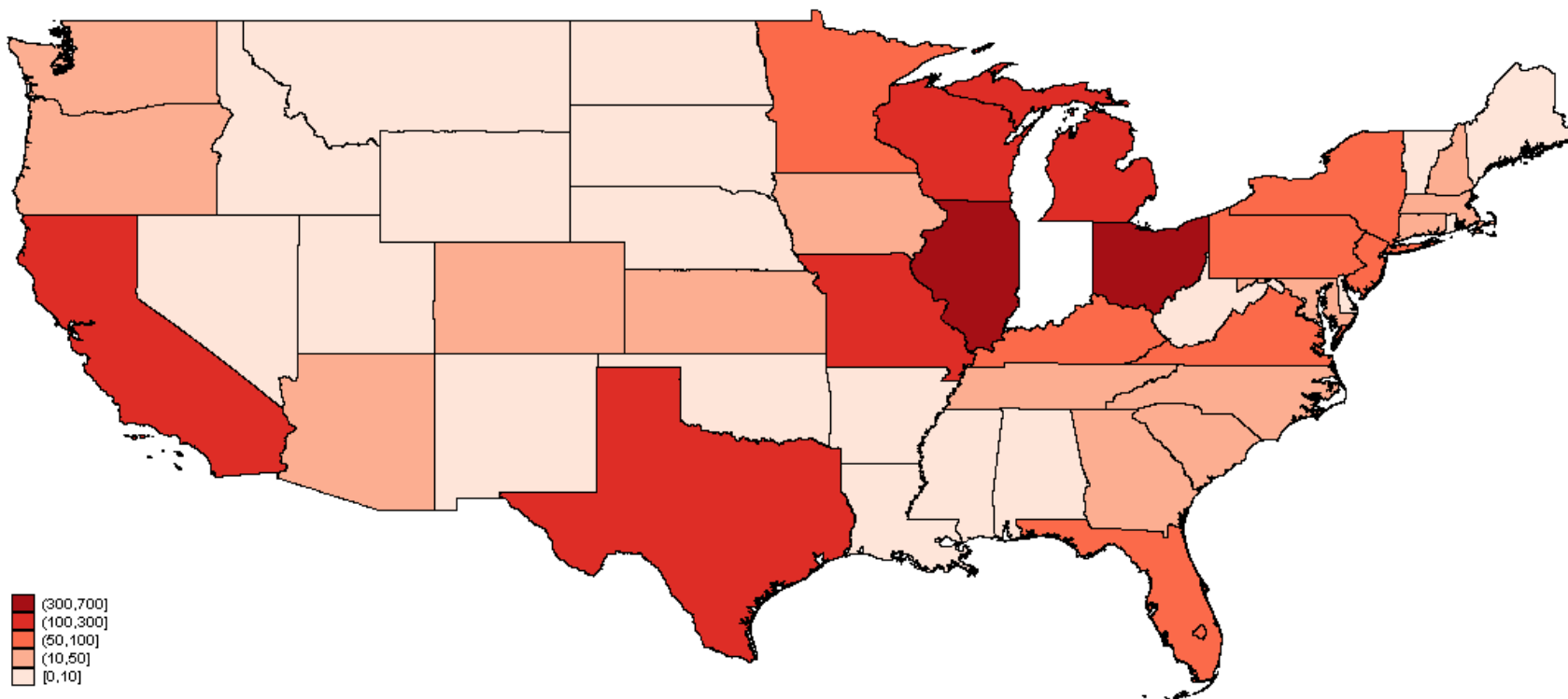


Note: AK (8 students), HI (8 students), PR (2 students) are omitted in the graph



2476 Out-of-state students (39.79% of all Out-of-State student)
left IN but didn't go home after graduation

Where do Out-of-State students go, if they leave IN and don't go home?



Note: AK (3 students), HI (10 students), PR (9 students) are omitted in the graph

Source: Purdue CCO Survey (2003-2014)



Appendix 7

Handout:

Indiana Workers – Where Do They Come From and Where Do They Go?

Krannert School of Management, Purdue University

Indiana's Talent Gap and Brain Drain/Gain Workshop – Making Indiana a Magnet for Jobs and Talent

Indiana Workers – Where do they come from and Where do they go?

David Hummels, Kevin Mumford, Tim Bond, Xiaoxiao Li, Paul Thomas, and Kan Yue
Department of Economics, Purdue University

I. Indiana General Mobility Facts

On average, Indiana experiences a net inflow of workers. However, nearly all of the net gain are workers without a college degree. For workers with a college degree, Indiana approximately breaks even, gaining about as many as move away each year.

The difference between the average salary of college graduate and the average salary of non-college graduate is increasing (and has been for decades). However, the college wage premium is lower in the Midwest than in the rest of the country and the college wage premium is even lower in Indiana than in the rest of the Midwest states.

Source: American Community Survey (ACS, 2015)

II. Purdue Graduates Overall Summary

On average, in-state students are much more likely to stay in Indiana after graduation (61%) than are out-of-state students (12%). About 16% of international students stay in Indiana after graduation. College graduates who leave Indiana more frequently take jobs in other Midwestern states than in the big coastal states. Note also that 45% of the out-of-state (domestic) students who leave IN after graduation do not go back to their home state.

The fraction of graduates who stay in Indiana varies by occupation, with higher staying rate for Non-STEM occupations. On average, the staying rate is 66% in Non-STEM occupations versus 52% in STEM occupations for in-state students, and a similar pattern is also observed for out-of-state (domestic and international) students with a smaller gap.

There are larger differences as we move to finer definitions of occupations. For instance, nearly all social workers stay in Indiana after graduation (94%) while very few chemical engineers stay in Indiana (27%). There is some evidence that, on average, the college graduates who leave Indiana were slightly better students.

Source: Purdue CCO Survey (2003-2014)

Purdue in-state students

| Occupation | Total Students | Total IN Students | Purdue In-state Students | | | | | | | | | |
|------------------------|----------------|-------------------|--------------------------|---------------|-------------|---------------|-----------------|-------------|---------------|-------------|---------------|-----------------|
| | | | Stayers | percent | GPA | Female | Salary | Leavers | percent | GPA | Female | Salary |
| Business | 5494 | 3679 | 2259 | 61.40% | 3.10 | 50.95% | \$37,861 | 1420 | 38.60% | 3.12 | 48.59% | \$45,949 |
| Engineering | 4723 | 2415 | 1100 | 45.55% | 3.01 | 16.00% | \$50,137 | 1315 | 54.45% | 3.10 | 20.61% | \$57,128 |
| Computer | 1628 | 975 | 430 | 44.10% | 3.06 | 18.14% | \$44,580 | 545 | 55.90% | 3.13 | 17.25% | \$58,327 |
| Education | 1443 | 1219 | 1037 | 85.07% | 3.39 | 75.22% | \$30,571 | 182 | 14.93% | 3.38 | 76.37% | \$33,757 |
| Sales | 1206 | 868 | 525 | 60.48% | 3.00 | 44.38% | \$37,499 | 343 | 39.52% | 3.06 | 49.56% | \$42,631 |
| Healthcare | 998 | 832 | 688 | 82.69% | 3.28 | 93.31% | \$34,526 | 144 | 17.31% | 3.25 | 93.75% | \$44,689 |
| Construction | 818 | 591 | 275 | 46.53% | 3.10 | 11.27% | \$44,443 | 316 | 53.47% | 3.11 | 10.44% | \$48,736 |
| Communication | 681 | 488 | 266 | 54.51% | 3.14 | 62.78% | \$31,148 | 222 | 45.49% | 3.16 | 54.95% | \$38,754 |
| Science | 548 | 389 | 257 | 66.07% | 3.03 | 52.92% | \$30,072 | 132 | 33.93% | 3.10 | 47.73% | \$38,935 |
| Services | 523 | 326 | 182 | 55.83% | 3.03 | 41.21% | \$27,174 | 144 | 44.17% | 3.07 | 48.61% | \$28,392 |
| Social Services | 390 | 334 | 300 | 89.82% | 3.13 | 78.00% | \$26,715 | 34 | 10.18% | 3.16 | 70.59% | \$38,146 |
| Agriculture | 276 | 238 | 187 | 78.57% | 2.95 | 26.20% | \$32,235 | 51 | 21.43% | 2.98 | 39.22% | \$39,191 |
| Manufacturing | 253 | 192 | 110 | 57.29% | 2.96 | 20.00% | \$35,792 | 82 | 42.71% | 3.05 | 29.27% | \$51,705 |
| All Occupations | 18981 | 12546 | 7616 | 60.70% | 3.13 | 49.55% | \$38,384 | 4930 | 39.30% | 3.12 | 37.63% | \$49,570 |

1. Percent of Purdue graduates from Indiana that stay in Indiana by broadly defined occupations:

- Highest staying rate occupations: Social Service (90%); Education (85%); Healthcare (83%)
- Lowest Staying rate occupations: Computer (44%); Engineering (46%); Construction (47%)
- For most occupations, leavers have a higher average college GPA.
- Across occupations, there is no systematic gender difference between stayers and leavers.
- Average real salary (in 2009 constant dollars) is higher for leavers in all major occupation groups.

2. Who is more likely to stay?

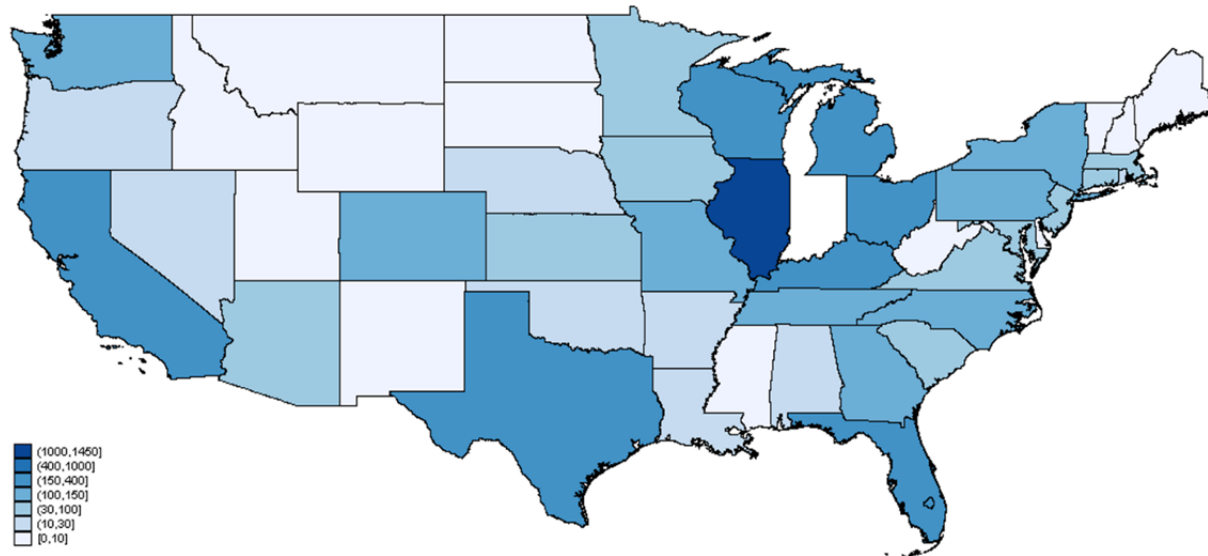
- Female students are more likely to choose majors that lead to occupations where most graduates stay, for example, Early Childhood Education.
- Purdue graduates who stayed had lower average SAT math scores and lower average college GPAs than those who left.

3. Where do IN students go, if they leave?

- Chicago, other Midwestern states, CA, TX, FL

4930 In-State students (39.30% of all In-State students) left IN after graduation

Where do IN students go, if they leave?



Note: AK (8 students), HI (8 students), PR (2 students) are omitted in the graph

Source: Purdue CCO Survey (2003-2014)

| Purdue Out-of-State Domestic Students | | | | | | | | | | | | | | | | | |
|---------------------------------------|----------------|--------------------|-----------------------|---------------|-------------|---------------|-----------------|------------------------|---------------|-------------|---------------|-----------------|-------------|---------------|-------------|---------------|-----------------|
| Occupation | Total Students | Total Out Students | Leavers to Home State | | | | | Leavers to Other State | | | | | | | | | |
| | | | Stayers | percent | GPA | Female | Salary | percent | GPA | Female | Salary | | | | | | |
| Business | 5494 | 1734 | 191 | 11.01% | 3.09 | 52.88% | \$41,281 | 931 | 53.69% | 3.05 | 46.83% | \$44,742 | 612 | 35.29% | 3.12 | 44.61% | \$49,611 |
| Engineering | 4723 | 2235 | 228 | 10.20% | 2.94 | 27.63% | \$50,200 | 941 | 42.10% | 3.04 | 18.70% | \$56,052 | 1066 | 47.70% | 3.09 | 28.33% | \$58,663 |
| Computer | 1628 | 618 | 49 | 7.93% | 2.92 | 14.29% | \$46,539 | 320 | 51.78% | 3.07 | 17.50% | \$56,226 | 249 | 40.29% | 3.08 | 23.29% | \$58,178 |
| Education | 1443 | 222 | 64 | 28.83% | 3.35 | 78.13% | \$30,400 | 118 | 53.15% | 3.33 | 77.12% | \$35,052 | 40 | 18.02% | 3.37 | 92.50% | \$30,983 |
| Sales | 1206 | 332 | 37 | 11.14% | 2.95 | 51.35% | \$37,623 | 169 | 50.90% | 3.00 | 50.30% | \$38,948 | 126 | 37.95% | 2.98 | 45.24% | \$43,541 |
| Healthcare | 998 | 165 | 34 | 20.61% | 3.28 | 91.18% | \$43,879 | 100 | 60.61% | 3.27 | 94.00% | \$43,738 | 31 | 18.79% | 3.27 | 93.55% | \$45,008 |
| Construction | 818 | 225 | 21 | 9.33% | 3.12 | 14.29% | \$42,318 | 114 | 50.67% | 3.10 | 13.16% | \$49,366 | 90 | 40.00% | 3.07 | 14.44% | \$51,961 |
| Communication | 681 | 187 | 21 | 11.23% | 3.22 | 47.62% | \$33,720 | 98 | 52.41% | 3.17 | 56.12% | \$36,957 | 68 | 36.36% | 3.17 | 60.29% | \$39,882 |
| Science | 548 | 156 | 36 | 23.08% | 3.10 | 69.44% | \$30,503 | 68 | 43.59% | 3.02 | 54.41% | \$42,848 | 52 | 33.33% | 3.07 | 57.69% | \$41,821 |
| Services | 523 | 195 | 29 | 14.87% | 3.15 | 37.93% | \$30,673 | 77 | 39.49% | 3.08 | 49.35% | \$31,121 | 89 | 45.64% | 3.12 | 34.83% | \$30,056 |
| Social Services | 390 | 55 | 19 | 34.55% | 3.08 | 78.95% | \$25,422 | 29 | 52.73% | 3.03 | 68.97% | \$38,659 | 7 | 12.73% | 2.96 | 57.14% | \$36,988 |
| Agriculture | 276 | 37 | 8 | 21.62% | 3.14 | 62.50% | \$32,966 | 16 | 43.24% | 3.13 | 62.50% | \$33,333 | 13 | 35.14% | 2.78 | 61.54% | \$34,556 |
| Manufacturing | 253 | 61 | 7 | 11.48% | 3.10 | 28.57% | \$39,655 | 21 | 34.43% | 3.07 | 38.10% | \$47,585 | 33 | 54.10% | 3.02 | 33.33% | \$51,679 |
| All Occupations | 18981 | 6222 | 744 | 11.96% | 3.06 | 45.97% | \$42,921 | 3002 | 48.25% | 3.07 | 37.34% | \$49,163 | 2476 | 39.79% | 3.10 | 36.11% | \$53,304 |

Purdue out-of-state domestic students

1. Percent of Purdue graduates from other states (out-of-state domestic) that stay in Indiana by broadly defined occupations:

- Highest staying rate occupations: Social Service (35%); Education (29%); Science (23%)
- Lowest Staying rate occupations: Computer (8%); Construction (9%); Engineering (10%)
- A significant proportion of graduates leave Indiana to go to a state other than their home state.

- No strong evidence that leavers have higher GPAs than stayers and no systematic gender difference between stayers and leavers.
- Average real salary (in 2009 constant dollars) is higher for leavers in most occupations.

2. Who is more likely to stay?

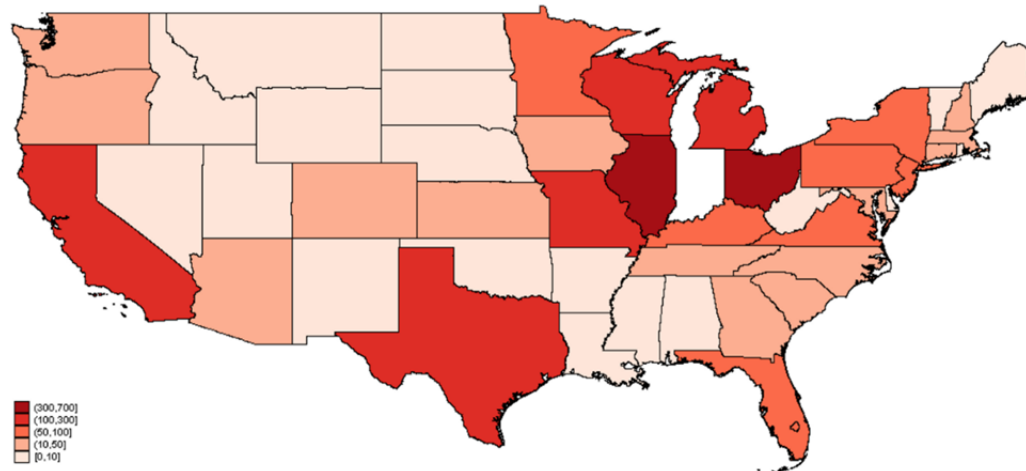
- Again, female students are more likely to graduate in a major where a higher fraction stay in Indiana.

3. Where do Out-of-state students go, if they leave IN but do not go home?

- Illinois and Ohio
- Midwest Region, CA, and TX

2476 Out-of-state students (39.79% of all Out-of-State student) left IN but didn't go home after graduation

Where do Out-of-State students go, if they leave IN and don't go home?

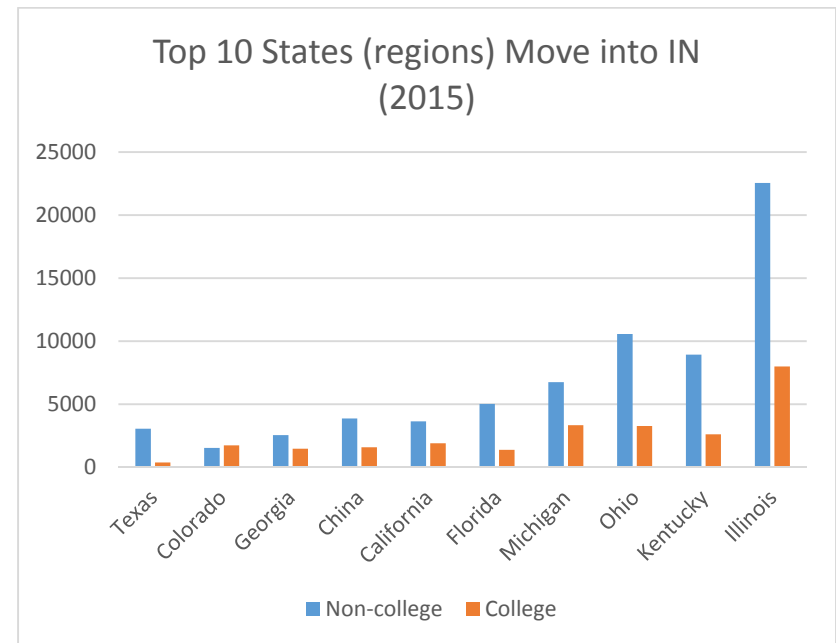
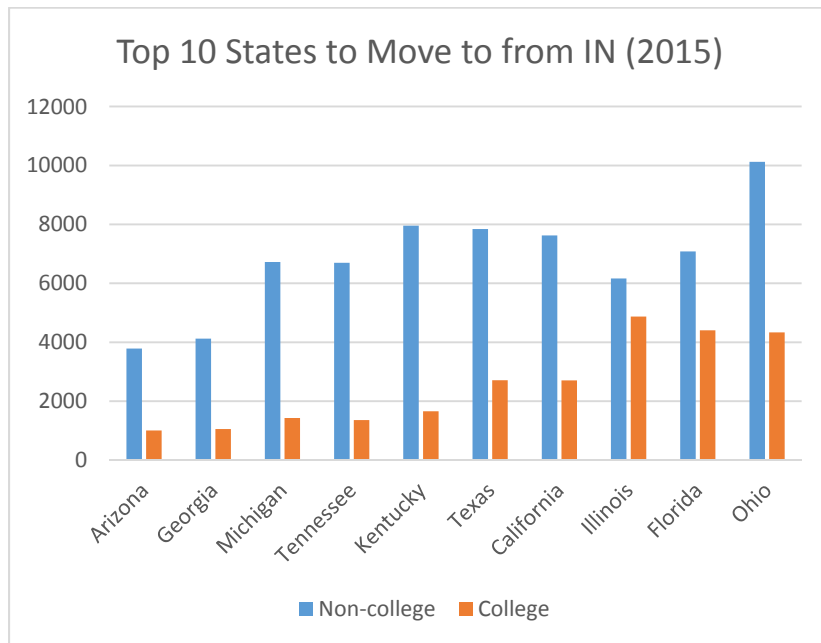


Note: AK (3 students), HI (10 students), PR (9 students) are omitted in the graph

Source: Purdue CCO Survey (2003-2014)

III. Indiana Overall Flow

The outflow of Purdue college graduates into other states is very similar to the outflow pattern of Indiana workers in general. The inflow of workers into Indiana is mostly from the nearby states, including workers both with and without college degrees.



Source: American Community Survey (ACS, 2015)

Appendix 8

Social Media – Twitter during the Workshop

Tweets for Indiana Talent Gap and Brain Drain/Gain Workshop: Research at Purdue account

Join us this morning as we live tweet the IN Talent Gap and Brain Drain/Gain Workshop #INHR17

Keynote panel with Mark Ferrara of Lilly, Sue Ellspermann of Ivy Tech and Suresh Garimella of Purdue.
<https://t.co/IMzyQCme0q>

Overview of this morning's workshop on making IN a magnet for jobs and talent. #INHR17
@PurdueUnivNews @LillyPad @IvyTechCC <https://t.co/OGxya0z4L1>

The workshop is part of the 53rd Annual Human Resource Conference and Expo. #INHR17
<https://t.co/lKzW8VTxY7>

Suresh Garimella starts off by thanking Lilly Endowment for promoting opportunities via educational collaboration. #INHR17 @PurdueUnivNews <https://t.co/RfxyTZARAQ>

Suresh Garimella: Purdue has a lot of startup companies to create magnet for jobs and talent. #INHR17
@PurdueUnivNews

Suresh Garimella: Purdue also has several entities that help match students with available jobs in Indiana. #INHR17 @PurdueUnivNews

12-county region from Purdue to Ball State to Indy rivals Research Triangle Park, etc.: Suresh Garimella
#INHR17 @PurdueUnivNews

Indiana is the only state with statewide community college system. #INHR17 @IvyTechCC
@PurdueUnivNews

Sue Ellspermann @IvyTechCC: Ivy Tech working to understand how many of what jobs Indiana needs.
#INHR17 @PurdueUnivNews <https://t.co/zAaVlpzrqg>

.@IvyTechCC has created this tool to help visualize demand vs. supply for various professions in Indiana.
#INHR17 @PurdueUnivNews <https://t.co/C1JyrWEf8k>

.@IvyTechCC helps students identify where the need is greatest: Sue Ellspermann #INHR17
@PurdueUnivNews

Most of @IvyTechCC students stay in Indiana so it's important to help make sure they can find jobs: Sue
Ellspermann #INHR17 @PurdueUnivNews

Mark Ferrara @LillyPad makes opening remarks #INHR17 @PurdueUnivNews <https://t.co/UQmIY0gRjW>

We should brand Indy for what it is, not for what we are competing against: Mark Ferrara @LillyPad
#INHR17 @PurdueUnivNews

We have secret sauce because all of govt., business, labor entities all work together: Sue Ellspermann
@IvyTechCC @PurdueUnivNews #INHR17 <https://t.co/b12y5DAggR>

We have strong mayors and quality of place in our communities: Sue Ellspermann @IvyTechCC @PurdueUnivNews #INHR17

"Don't be afraid to come to us to say 'we need to work together.'" Sue Ellspermann @IvyTechCC tells HR folks at #INHR17

We believe we are a fabric of this community and have been since 1876: Mark Ferrara @LillyPad @PurdueUnivNews #INHR17 <https://t.co/gcdSvKXYfG>

Mark Ferrara @LillyPad: We highly encourage our employees to get involved in our neighborhoods and to be on boards. @PurdueUnivNews #INHR17

We are strong, strong advocates of United Way: Mark Ferrara @LillyPad #INHR17 @PurdueUnivNews

When we act cohesively, I think we get more done: Mark Ferrara @LillyPad #INHR17 @PurdueUnivNews

Mark Ferrara @LillyPad: Sometimes I think we want to brand ourselves as competing against oceans, Broadway, etc. #INHR17 @PurdueUnivNews

How can Indiana support small businesses? Sue Ellspermann @IvyTechCC says one key is coworking space. #INHR17 @PurdueUnivNews

Mark Ferrara @LillyPad: Innovation is tied to diversity. #INHR17 @PurdueUnivNews

Sometimes investing in small businesses for supplies may not be most efficient but is the right thing: Mark Ferrara @LillyPad #INHR17

Indiana is life sciences hub as shown in part by startups and licensed technologies: Suresh Garimella. @PurdueUnivNews #INHR17

Sue Ellspermann @IvyTechCC: Higher ed. is partly responsible for teaching professional skills like writing emails. @PurdueUnivNews #INHR17

.@IvyTechCC @PurdueUnivNews ... But partnerships with business are important for helping new grads develop those skills: Sue Ellspermann @IvyTechCC #INHR17

Mark Ferrara @LillyPad: We are looking for grit and gratitude. @PurdueUnivNews #INHR17

Sue Ellspermann: @IvyTechCC has co-ops and apprentice programs to help students learn applied skills. #INHR17

Up next: Panel discussion on Creating Jobs and Filling the Talent Gap #INHR17

Panelists are from Ascend Indiana, Dept. of Workforce Dev., In. Chamber, Purdue Center for Reg. Dev., and Purdue. #INHR17 @PurdueUnivNews

Caryl Auslander @IndianaChamber: Businesses want to grow but struggle finding right employees. #INHR17 @PurdueUnivNews <https://t.co/VbGHx6kjr>

Bo Beaulieu, Purdue Center for Regional Development: in terms of bachelor level education, Indiana not keeping up. #INHR17 @PurdueUnivNews <https://t.co/BQ4SV81fuR>

.@PurdueUnivNews In terms of some college/associates: data more encouraging but need to translate more to associates degree. #INHR17

.@PurdueUnivNews Supporting slides from Bo. #INHR17 @PurdueUnivNews <https://t.co/m0pxZWI9j5>

Mike Barnes of IN Workforce Dev.: projected gap between skilled people and vacant jobs over next few years. #INHR17 @PurdueUnivNews <https://t.co/34qmg9wAme>

.@PurdueUnivNews Working with metro, rural areas to better understand positions, skills and education needed for future jobs. #INHR17

.@PurdueUnivNews Also working with educational institutions to help close that gap through short term certificates, etc. #INHR17

.@AscendIndiana @PurdueUnivNews Too few students pursuing education in high demand fields. #INHR17

Demand for high skilled talent in Indiana is increasing: Sally Reasoner @AscendIndiana #INHR17 @PurdueUnivNews <https://t.co/36ZTmTvYsV>

.@AscendIndiana @PurdueUnivNews .@AscendIndiana helping to keep more students in state; many new grads not familiar with Indiana brands. #INHR17

.@AscendIndiana @PurdueUnivNews .@AscendIndiana meets 1:1 with students to help them understand opportunities in state. #INHR17

Great crowd at this workshop on Creating Jobs and Filling the Talent Gap. #INHR17 @PurdueUnivNews <https://t.co/luwf7oUZPI>

.@AscendIndiana @PurdueUnivNews Evaluating students on 6 core character traits indicative of success.

.@AscendIndiana @PurdueUnivNews Employers need "employability skills" but they vary across companies in terms of what they want and how they measure them. #INHR17

.@IndianaChamber @PurdueUnivNews Chamber has worked w/ Workforce Dev and IN to teach students soft skills that employers say are lacking in students.

.@IndianaChamber @PurdueUnivNews This is focused on students who enter workforce directly after high school or associates degree.

.@IndianaChamber @PurdueUnivNews Disciplinary issues have gone down in students who have pursued this certificate.

.@IndianaChamber @PurdueUnivNews It's important that kids have access to early childhood education so they are ready to start kindergarten: Caryl Auslander #INHR17

#INHR17 participants: Please remember to complete the Talent Gap questionnaire before leaving today! Purdue will compile results. <https://t.co/90DfVXG8Im>

Purdue recruiting people from London, NY etc. because quality of life better, commute time shorter: David Hummels @PurdueKrannert INHR17

@datachick I think a lot of the people here at this workshop would say that's not necessarily the case.

Bo Beaulieu from Purdue: we need to be better ambassadors for Indiana. #INHR17

Sally Reasoner @AscendIndiana: Indiana offers vibrant quality of life outside the workplace. #INHR17

Drop them off at the back of Veterans 4/5 at the conference.

Up next: Attracting Talent to Indiana with representatives from Purdue, @BallState and @IUPUI. #INHR17

Ned Howell from Purdue EVPRP office introduces panel. #INHR17 <https://t.co/ZswJAgk7tH>

Kevin Mumford @PurdueKrannert discusses results of study on where Indiana workers come from and where they go. #INHR17 <https://t.co/QKwfkmvHir>

.@PurdueKrannert On average, Indiana experiences a net flow of workers: Kevin Mumford @PurdueKrannert #INHR17

.@PurdueKrannert On a average in-state students more likely to stay in Indiana: Kevin Mumford @PurdueKrannert #INHR17

.@PurdueKrannert Where Indiana grads go: it's not all to the coasts - Kevin Mumford @PurdueKrannert #INHR17

.@PurdueKrannert Many in-state students go to Chicago and other Midwestern states: Kevin Mumford @PurdueKrannert #INHR17

Molly Chavers from @IndyHub discusses the strides Indy has made in attracting talent. @PurdueUnivNews #INHR17 <https://t.co/qUIIGyTaJi>

Molly Chavers @IndyHub: increased civic engagement leads to employer and community loyalty. #INHR17 @PurdueUnivNews

We need to start talking about what our cities and towns in Indiana have not what they don't have: Molly Chavers @IndyHub #INHR17

Many 20-30 y.o. leave their employer because they don't see a career path forward: Molly Chavers @IndyHub #INHR17

Kristina Bender, Purdue alum, studied communications and did many internships. #INHR17
<https://t.co/IJTXqiBrWF>

Kristina Bender got a job in Chicago with a global PR firm but didn't like travel time, cost of living, size of company, etc. #INHR17

Kristina Bender found her place at @TrendyMinds, a small boutique firm. #INHR17

Angela Petrie visited San Francisco and "I realized I would be homeless in a day" because of cost of living. #INHR17

Angela Petrie got Lilly Endowment scholarship to study at Purdue. #INHR17 <https://t.co/L5J1t6weie>

Angela Petrie stayed in Lafayette for awhile but found a better fit in Columbus, Ohio. #INHR17

Megan McKinney @BallState decided after her internship last year to pursue cyber security. She has job lined up in Chicago. #INHR17 <https://t.co/OkZA9gMfWK>

Corey Elliott is press secretary for Indiana attorney general after starting at Ivy Tech then studying journalism at @IUPUI. #INHR17 <https://t.co/n0xIRvfyYr>

Molly Chavers @IndyHub: central Indiana provides job opportunities like the coasts but also access to leaders like small towns. #INHR17

@datachick The point of this workshop was to identify ways that Indiana can and is closing the education gap. 1/

@datachick One way to do that is by assessing employer needs and developing skills certificates at community colleges. 2/

@datachick Another way is finding out how to attract and retain college grads by helping them see opportunities in the state. 3/

@datachick As with anywhere else, Indiana has many different jobs requiring different skill levels. The key is to match demand with supply. 4/

Suresh Garimella, EVPRP, wraps up the Talent Gap and Brain Drain/Gain Workshop. #INHR17
<https://t.co/42J8MJuyj4>

Questions about today's workshop on talent gap and brain drain/gain? Please contact Ned Howell at ned@purdue.edu. #INHR17

We need to instill in everyone the need for lifelong learning: Suresh Garimella #INHR17
@PurdueUnivNews

Thanks for following our tweets this morning at #INHR17.