

# The Apprenticeship Alternative

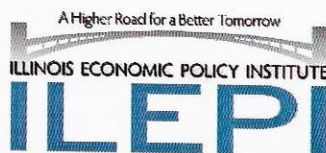
*Enrollment, Completion Rates, and Earnings in  
Registered Apprenticeship Programs in Illinois*

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**Frank Manzo IV, MPP**  
Policy Director  
Illinois Economic Policy Institute

**Robert Bruno, PhD**  
Director and Professor  
Project for Middle Class Renewal  
University of Illinois at Urbana-Champaign



**I ILLINOIS** LABOR & EMPLOYMENT  
RELATIONS  
PROJECT FOR MIDDLE CLASS RENEWAL

## Executive Summary

Registered apprenticeships are training programs in which participants get the opportunity to “earn while they learn” with tuition costs covered by employers or joint labor-management organizations, who gain access to a pool of skilled, productive, and safe workers. Apprenticeship training is particularly important to the construction industry.

### **Joint labor-management apprenticeship programs account for the vast majority of registered apprentices in Illinois’ construction industry.**

- Joint labor-management programs are cooperatively administered and have standards, wages, and “cents per hour” contributions that are negotiated privately between contractors and unions.
- Between 2000 and 2016, more than 74,000 construction apprentices (97 percent) were enrolled in joint labor-management programs compared to fewer than 2,000 in employer-only programs.
- Joint construction programs enrolled 98 percent of all women, 99 percent of all African Americans, 98 percent of all Latinx apprentices, and 97 percent of all military veterans.

### **Joint construction apprenticeship programs require 27 percent more hours of training than four-year universities.**

- On average, apprentices in joint construction programs are required to complete 7,306 hours of training.
- By contrast, employer-only construction programs require an average of 6,267 hours and the typical bachelor’s degree at the University of Illinois requires a minimum of 5,760 hours.

### **The joint program completion rate far exceeds employer-only programs and compares favorably to universities.**

- Joint construction programs have a 54 percent completion rate since 2000.
- Employer-only construction programs recorded a low completion rate of 31 percent, with the Illinois Chapter of the Associated Builders and Contractors graduating just 16 percent of its trainees since 2000.
- The graduation rate was 61 percent at public universities, 66 percent at nonprofit universities, and 43 percent at for-profit four-year institutions.
- On average, female apprentices are 4 percentage points more likely to complete construction apprenticeship programs than male apprentices and military veterans are 4 percentage points more likely than non-veterans.
- Joint construction programs have higher completion rates regardless of race, gender, and veteran status.
- The racial diversity of graduates from joint construction programs is similar to Illinois’ public universities.

### **Registered apprenticeship programs— particularly joint programs— deliver good middle-class careers for Illinois workers and rival bachelor’s degrees in terms of expected lifetime earnings.**

- In joint construction programs, the average first-year apprentice earns \$19.15 per hour and the average journeyworker earns \$40.40 per hour.
- In employer-only construction programs, the entry wage is \$16.54 and the exit wage is \$23.46 on average.
- A journeyworker who completes a joint labor-management program will make more than double the pre-tax lifetime earnings of a similar worker from an employer-only program.
- Despite a higher likelihood of suffering an unemployment spell, a union journeyworker earns about as much over a career (\$2.4 million) as a worker with a bachelor’s degree (\$2.5 million after student debt).

### **Registered apprenticeship programs should be encouraged as a viable alternative to college for Illinois’ youth.**

- Pre-apprenticeship programs should be expanded to end the stigma of choosing trade schools over college.
- Apprenticeship programs can improve completion rates for apprentices from disadvantaged backgrounds by developing mentoring programs and hiring more instructors who are people of color.
- Illinois should expand access to child care, a significant barrier to female participation in the trades.
- The State of Illinois should promote the new apprenticeship education expense tax credit to businesses to address the shortage of workers who are qualified for job openings in “middle-skill” occupations.
- The State of Illinois should promote joint labor-management programs— the gold standard in apprenticeship training— and challenge any federal action that could undermine them.

A registered apprenticeship program is a great alternative to college for Illinois’ youth. In particular, the unionized construction trades have rigorous programs with training hours, graduation rates, and competitive pay that rival four-year universities in Illinois. Education pays, but so does a registered apprenticeship program.

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## About the Authors

**Frank Manzo IV, MPP** is the Policy Director of the Illinois Economic Policy Institute. He earned a Master of Public Policy from the University of Chicago Harris School of Public Policy and a Bachelor of Arts in Economics and Political Science from the University of Illinois at Urbana-Champaign. He can be contacted at [fmanzo@illinoisepi.org](mailto:fmanzo@illinoisepi.org).

**Robert Bruno, PhD** is a Professor at the University of Illinois at Urbana-Champaign School of Labor and Employment Relations and is the Director of the Project for Middle Class Renewal. He earned a Doctor of Philosophy in Political Theory from New York University, a Master of Arts from Bowling Green State University, and a Bachelor of Arts from Ohio University. He can be contacted at [bbruno@illinois.edu](mailto:bbruno@illinois.edu).

## Introduction

Economic and social science research finds that investing in infrastructure and investing in education are the most effective public policies at boosting employment and growing the economy. For every dollar increase in infrastructure spending, the U.S. economy grows by \$1.57 (Zandi, 2010). In Illinois, research has found that every \$1 billion invested in highway, street, and bridge infrastructure creates nearly 11,000 jobs, including more than 6,000 direct jobs for construction workers (Craighead & Manzo, 2017).

Similarly, an extra year of education increases an individual's earnings by 7 to 10 percent and boosts economic growth (Stevens & Weale, 2003; Barro, 1997). Research has found that a 10 percent increase in spending on public education statistically improves the future wages of students by 7 percent and reduces their chances of living in poverty once they hit adulthood by 4 percent (Jackson et al., 2015). Additional research concludes that a 10 percent increase in per-pupil spending on public education has been found to increase the probability of high school graduation by 7 percentage points for all students and by 10 percentage points for low-income children in particular (Baker, 2018). A well-educated workforce builds the foundation for shared economic prosperity (Berger & Fisher, 2013).

Two reports by the Illinois Economic Policy Institute and the Project for Middle Class Renewal at the University of Illinois at Urbana-Champaign corroborate these conclusions. In an analysis of 24 different policies and economic phenomena, four public policies were found to directly support employment: improving the share of the population with a bachelor's degree, increasing the number of three and four year olds in early childhood education programs, improving and expanding highways and bridges, and reducing the average time spent commuting to work (Manzo & Bruno, 2015). Each of these policies statistically increases the working-age employment rate by enhancing productivity. Likewise, the policies that statistically reduce the African-American unemployment rate in urban counties include investing in public transportation and investing in education (Manzo et al., 2017).

However, additional education through four-year college degrees is not always the right path for everyone. For many young people, enrolling in a registered apprenticeship program is a better option than attending college or a university. Registered apprenticeships are training programs that help businesses in Illinois find skilled workers who are in high demand. Participating apprentices get the opportunity to "earn while they learn" with minimal or no out-of-pocket costs. Employers, joint labor-management organizations, and unions all sponsor apprenticeship programs, covering tuition costs and offering structured, on-the-job training and certified classroom instruction tailored to meet the needs of employers. In return for this significant investment, employers have access to a pool of skilled, productive, and safe workers who can efficiently deliver vital services and build high-quality infrastructure. By developing skills, apprenticeship programs create pathways into middle-class careers for young adults who are unable or unwilling to go to college. There are now nearly 16,000 active apprentices in Illinois, a 34 percent increase since 2011 (DOLETA, 2019).

Economic research finds that registered apprenticeship programs have positive economic impacts. Countries that have more widespread usage of apprenticeship programs are more successful at transitioning young workers into stable jobs, resulting in lower youth unemployment rates (Bertschy et al., 2009; Ryan, 2001; Ryan, 1998). In Germany, where these programs are especially prevalent, apprenticeships have been found to increase a worker's wages by 8 percent per year (Clark & Fahr, 2002). In the United States, participants in registered apprenticeship programs have been found to earn about \$124,000 more in wages and fringe benefits over their careers than similar non-participants (Reed et al., 2012).

Apprenticeship training is particularly important to the construction industry in America. Through registered apprenticeship programs, "construction operates the largest privately-financed system of higher education in the country" (Philips, 2014). Nearly all of this investment, however, comes from joint labor-management

programs cooperatively administered by labor unions and signatory employers. Joint labor-management programs account for 98 percent of all active construction apprentices in Illinois, 95 percent in Wisconsin, 94 percent in Indiana, 93 percent in Minnesota, 92 percent in Nevada, 82 percent in Ohio, 79 percent in Kentucky, and 78 percent in Michigan (Bruno & Manzo, 2016; Philips, 2015a; Philips, 2015b; Manzo & Duncan, 2018; Waddoups & Duncan, 2019; Onsarigo et al., 2017; Duncan & Manzo, 2016; Bilginsoy, 2017).

A 2016 study by the Illinois Economic Policy Institute and the Project for Middle Class Renewal at the University of Illinois at Urbana-Champaign finds that, if all registered apprenticeship programs for construction were combined, they would be one of the largest private post-secondary educational institutions in Illinois (Bruno & Manzo, 2016). These programs provide significant value to Illinois, directly creating nearly 5,000 total jobs in Illinois, including about 3,000 jobs for instructors and program staff. The programs boost the Illinois economy by more than \$1.2 billion, resulting in an \$11 return per dollar invested. In addition, the average income gain from participating in a registered apprenticeship program is nearly \$3,500 per year, which is greater than the impact of an associate's degree and many bachelor's degrees (Bruno & Manzo, 2016).

Investments in education and infrastructure boost employment and grow the economy. However, not all young people are able or willing to earn college degrees. For many, a registered apprenticeship program, which— in construction— is at the intersection between education and infrastructure, may offer an alternative pathway into the middle class. This report, authored jointly by the Illinois Economic Policy Institute and the Project for Middle Class Renewal at the University of Illinois at Urbana-Champaign, expands upon previous findings by using a larger dataset to compare enrollment statistics, graduation rates, and the earnings potential of apprentices in joint labor-management apprenticeship programs in construction to those in employer-only construction programs as well as to those in all other non-construction training programs. These outcomes in registered apprenticeship programs are also contrasted with colleges and universities in Illinois to apprenticeship as an alternative post-secondary option for high school graduates in the state. The report subsequently discusses policy implications for Illinois before a concluding section recaps key findings.

## RAPIDS Apprenticeship Data and Educational Attainment Data

The Registered Apprenticeship Partners Information Management Data System (RAPIDS) is a database of information on apprenticeship programs from participating states— including Illinois— that was collected and released by the Office of Apprenticeship (OA) at the U.S. Department of Labor. Apprenticeship programs are registered with the Department of Labor, which sets quality standards for the programs. The OA also provides employers and labor unions with technical assistance in establishing and operating effective training programs. As part of the quality assurance process, the OA required that approved programs provide data through the RAPIDS database.

This report evaluates RAPIDS apprenticeship data obtained from 2000 through 2016, the latest year for which information is available. Figure 1 presents a breakdown of all apprentices enrolled in USDOL-approved programs over the 17-year period. In total, nearly 90,000 individuals became apprentices in Illinois between 2000 and 2016 (Figure 1).

Apprenticeship programs in Illinois are largely focused on careers in the construction trades (Figure 1). More than 76,000 registered apprentices in Illinois were enrolled in a construction apprenticeship program between 2000 and 2016, accounting for 85 percent of all registered apprentices in the state. Most of the non-construction apprentices were training for manufacturing, transportation, wholesale, or public administration positions. Fire departments, private security forces, utility companies, and food service establishments also have registered apprenticeship programs in Illinois.

Apprenticeship programs are sponsored either jointly by labor unions and employers that are signatories to collective bargaining agreements (joint labor-management programs) or unilaterally by employers. Joint labor-management programs are cooperatively administered with standards, trainee wages, and apprentice-to-worker ratios established in CBAs. By contrast, employer-only programs are sponsored by a single employer or group of employers— usually through a trade association— who unilaterally determine program content, set entry requirements, and monitor trainee progress.

In Illinois' construction industry, joint labor-management apprenticeship programs account for the vast majority of registered apprentices (Figure 1). That is in large part because employer-only programs lack an institutional funding mechanism. By relying on voluntary contributions from employers, these programs can create a financial incentive for contractors to underinvest in long-term workforce development in order to win short-term bids. Joint programs, on the other hand, do have an institutional funding mechanism, typically through a “cents per hour” contribution requirement that is negotiated privately by contractors and workers. This training investment is part of a total wage, health care, and retirement package that promotes the recruitment, development, and retention of skilled workers to the industry, reducing turnover and providing contractors with long-term access to a pool of highly productive workers.

In Illinois, more than 74,000 construction apprentices were enrolled in joint labor-management programs compared to fewer than 2,000 in employer-only programs between 2000 and 2016 (Figure 1). Fully 97 percent of registered apprentices in construction were enrolled in joint programs. In fact, joint labor-management programs in construction alone accounted for 83 percent of all registered apprentices in the state.

**FIGURE 1: STATISTICS ON REGISTERED APPRENTICES ENROLLED BY TYPE OF PROGRAM AND INDUSTRY IN ILLINOIS, 2000-2016**

Type of Registered Apprenticeship Program	Enrolled Apprentices	Share of Apprentices
Joint Labor-Management Program in Construction	74,458	82.9%
Employer-Only Construction Program	1,921	2.1%
All Other Non-Construction Programs*	13,490	15.0%
<b>Total for All Registered Apprenticeship Programs</b>	<b>89,869</b>	<b>100.0%</b>
<i>Joint Labor-Management Share of Construction Apprenticeships</i>		<i>97.5%</i>

Source(s): RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor.

\*In addition to construction, industries with apprentices in Illinois include manufacturing (n= 5,149), transportation (n= 2,351), wholesale (n= 1,324), public administration (n= 1,901), and other sectors (n= 2,765).

This report also utilizes educational attainment data derived from two sources. One is the *IBHE Data Book*, a database with information collected and maintained by the Illinois Board of Higher Education. The *IBHE Data Book* includes demographic information about enrolled students, characteristics of individual colleges and universities, and completion rates by institution, among other items (IBHE, 2019). The other source is the *Current Population Survey Outgoing Rotation Groups* (CPS ORG) which is conducted and released by the Bureau of Labor Statistics (BLS) at the U.S. Department of Labor. The CPS ORG data reports individual-level information on 25,000 respondents nationwide each month. The records include data on wages, hours worked, industry, and occupation, as well as other demographic, geographic, education, and work variables (CEPR, 2019). CPS ORG information is used to compare entry wages for trainees and journey-level wages for apprenticeship program graduates to comparable earnings for those with associate's degrees, bachelor's degrees, and advanced degrees.

## Enrollment in Apprenticeship Programs and Colleges and Universities in Illinois

Joint labor-management programs train more than 9-in-10 registered apprentices (Figure 2). Between 2000 and 2016, joint labor-management programs enrolled 97 percent of all registered apprentices in the construction trades. Joint labor-management programs accounted for 97 percent of all male apprentices in construction and over 98 percent of all female apprentices in construction. These programs also registered 97 percent of all white

apprentices, 99 percent of all African American apprentices, and 98 percent of all Latinx apprentices. In fact, nearly 20,000 African American and Latinx apprentices were registered in joint construction programs compared to just over 300 for employer-only construction programs. Joint construction programs also comprised 97 percent of military veterans, 98 percent of apprentices with at least a high school degree, and the preponderance of all apprentices by age cohort—ranging from 88 percent of those 55 years old or older to 98 percent of those between the ages of 16 years old and 24 years old.

**FIGURE 2: DEMOGRAPHIC CHARACTERISTICS OF CONSTRUCTION APPRENTICES IN ILLINOIS, BY TYPE OF PROGRAM, 2000-2016**

Enrollment of Construction Apprentices, 2000-2016	Joint Labor-Management Programs	Employer-Only Programs	Total for All Programs	Joint Share
<b>Total (All Apprentices)</b>	<b>74,458</b>	<b>1,921</b>	<b>76,379</b>	<b>97.5%</b>
Gender: Male	72,099	1,884	73,983	97.5%
Gender: Female	2,359	37	2,396	98.5%
Race: White, non-Latinx	51,679	1,515	53,194	97.2%
Race: African American	6,637	99	6,736	98.5%
Race: Latinx	13,303	208	13,511	98.5%
Status: Military Veteran	4,484	154	4,638	96.7%
Age: 16-24 Years Old	32,740	710	33,450	97.9%
Age: 25-34 Years Old	29,539	750	30,289	97.5%
Age: 35-44 Years Old	9,471	306	9,777	96.9%
Age: 45-54 Years Old	2,388	113	2,501	95.5%
Age: 55 Years or Older	320	42	362	88.4%
Education: High School Graduate	66,059	1,548	67,607	97.7%

Source(s): RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor.

Joint labor-management construction programs in Illinois are more diverse than employer-only programs, such as those affiliated with the Associated Builders and Contractors (ABC). The share of registered apprentices who are women was 1 percentage point higher in the joint construction programs. The share who are African American was 4 percentage points higher and the share who are Latinx was 7 percentage points higher, while the share who are white alone was 9 percentage points lower (Figure 3).

**FIGURE 3: DEMOGRAPHIC SHARES OF CONSTRUCTION APPRENTICES BY TYPE OF PROGRAM IN ILLINOIS, 2000-2016**

Diversity of Construction Apprentices, 2000-2016	Share of Apprentices in Joint Labor-Management Programs	Share of Apprentices in Employer-Only Programs	Joint Difference
Gender: Male	96.8%	98.1%	-1.2%
Gender: Female	3.2%	1.9%	+1.2%
Race: White, non-Latinx	69.4%	78.9%	-9.5%
Race: African American	8.9%	5.2%	+3.8%
Race: Latinx	17.9%	10.8%	+7.0%
Status: Military Veteran	6.0%	8.0%	-2.0%
Age: 16-24 Years Old	44.0%	37.0%	+7.0%
Age: 25-34 Years Old	39.7%	39.0%	+0.6%
Age: 35-44 Years Old	12.7%	15.9%	-3.2%
Age: 45-54 Years Old	3.2%	5.9%	-2.7%
Age: 55 Years or Older	0.4%	2.2%	-1.8%
Education: High School Graduate	88.7%	80.6%	+8.1%

Source(s): RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor.

Both joint labor-management programs and employer-only programs have made efforts to diversify their trainees over time (Figure 4). Over the five-year period between 2002 and 2006, white men comprised 69 percent of the apprenticeship class in joint construction programs. A decade later, the five-year apprenticeship class was 64 percent white men— a 5 percentage point drop— and 36 percent women and people of color. The

comparable shares of white men in employer-only programs were 86 percent between 2002 and 2006 and 70 percent between 2012 and 2016, a 16 percentage point decrease. In construction, joint labor-management programs have consistently registered more diverse apprenticeship classes since the turn of the millennium.

**FIGURE 4: CHANGE IN THE SHARE OF CONSTRUCTION APPRENTICES WHO ARE WHITE MEN BY TYPE OF PROGRAM IN ILLINOIS**

White Male Share of Construction Apprentices	Joint Labor-Management Programs	Employer-Only Programs
Years: 2002-2006	68.6%	86.1%
Years: 2007-2011	70.0%	78.5%
Years: 2012-2016	64.0%	70.2%
<b>Change over Decade</b>	<b>-4.6%</b>	<b>-15.9%</b>

Source(s): RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor.

Registered apprenticeships are concentrated in historically male-dominated industries, such as manufacturing, transportation and trucking, and wholesale trade (Figure 5). An analysis of more than 13,000 apprentices enrolled in programs targeting sectors outside of construction reveals that 91 percent of all non-construction apprentices were men and only 9 percent were women between 2000 and 2016. The racial and ethnic identification of apprentices in non-construction training programs was 63 percent white, 14 percent African American, and 12 percent Latinx. Military veterans constituted 14 percent of the non-construction apprentices. The most notable difference between non-construction apprentices and construction apprentices is by education attainment. Whereas 89 percent of construction apprentices reported to the U.S. Department of Labor that they had earned at least a high school degree, only 75 percent of non-construction apprentices had received a high school diploma or equivalent.

**FIGURE 5: DEMOGRAPHIC SHARES OF REGISTERED APPRENTICES, ALL NON-CONSTRUCTION PROGRAMS IN ILLINOIS, 2000-2016**

Diversity of Non-Construction Apprentices, 2000-2016	Number of Apprentices in All Non-Construction Programs	Share of Apprentices in All Non-Construction Programs
<b>Total (All Apprentices)</b>	<b>13,492</b>	<b>100.0%</b>
Gender: Male	12,303	91.2%
Gender: Female	1,189	8.8%
Race: White, non-Latinx	8,517	63.1%
Race: African American	1,867	13.8%
Race: Latinx	1,637	12.1%
Status: Military Veteran	1,860	13.8%
Age: 16-24 Years Old	3,092	22.9%
Age: 25-34 Years Old	5,024	37.2%
Age: 35-44 Years Old	2,745	20.3%
Age: 45-54 Years Old	1,355	10.0%
Age: 55 Years or Older	1,276	9.5%
Education: High School Graduate	10,155	75.3%

Source(s): RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor. Industries include manufacturing (n= 5,149), transportation (n= 2,351), wholesale (n= 1,324), public administration (n= 1,901), and other sectors (n= 2,765).

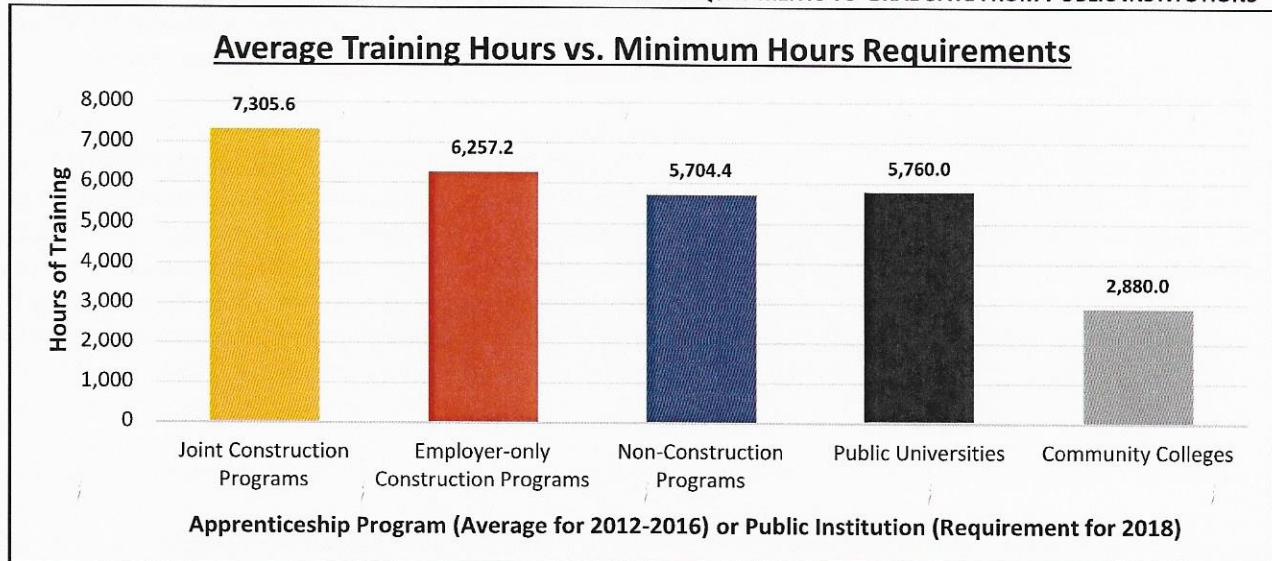
## Apprenticeship Graduation Requirements Compared with Illinois' Colleges and Universities

Building high-quality infrastructure that is safe and durable requires an experienced, skilled workforce. Accordingly, many registered apprenticeship programs are very rigorous in Illinois, providing thousands of hours of classroom and on-the-job training to boost workers' skills. On average, registered apprentices enrolled in joint labor-management programs in construction are required to complete 7,306 hours of classroom and on-the-job training (Figure 6). Some programs require even more. The apprenticeship program sponsored jointly by the



International Union of Operating Engineers Local 150 and signatory contractors, for example, requires up to 8,864 hours of training over five years for heavy equipment technicians (Bruno & Manzo, 2016).

**FIGURE 6: HOURS OF APPRENTICESHIP TRAINING VS. MINIMUM REQUIREMENTS TO GRADUATE FROM PUBLIC INSTITUTIONS**



Source(s): RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor; “Minimum Requirements for a Degree” at the University of Illinois at Urbana-Champaign (UIUC, 2018) and community colleges (College Illinois, 2015).

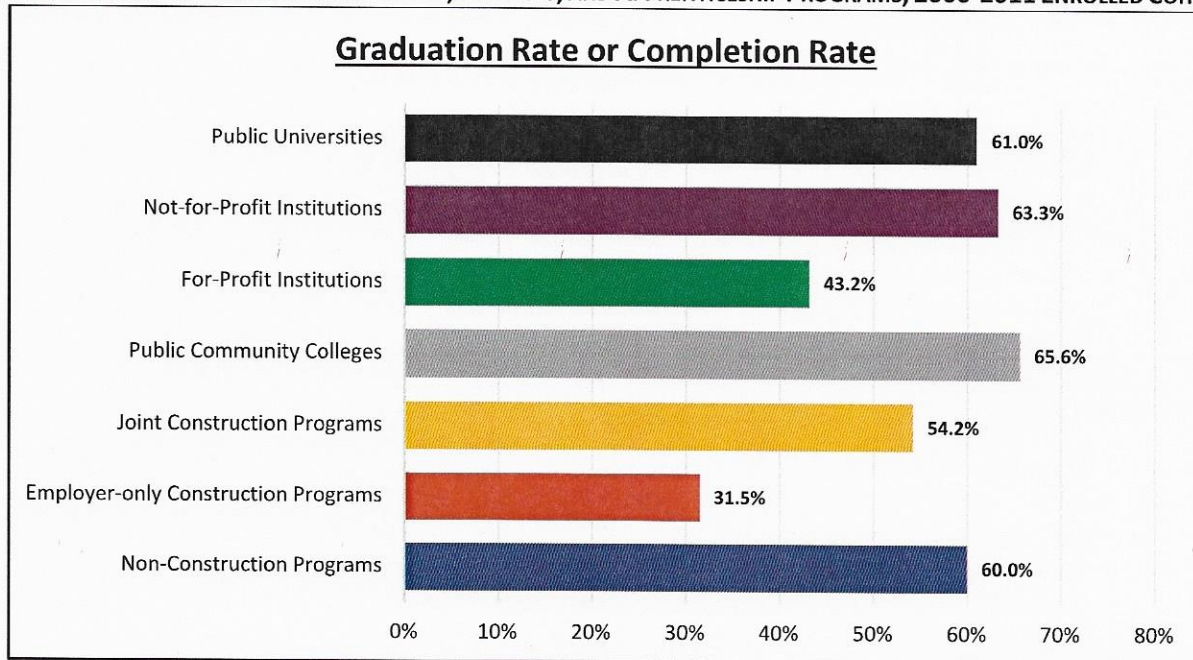
Joint labor-management programs in construction require more hours of classroom and on-the-job training than both university-level education and other types of registered apprenticeships (Figure 6). While joint construction programs have an average term length of 7,306 hours, apprentices in employer-only construction programs report an average requirement of 6,257 hours and apprentices in non-construction programs report having to complete 5,704 hours. By contrast, the typical 120-credit hour bachelor’s degree at public universities in Illinois—such as the University of Illinois at Urbana-Champaign—requires a minimum of 5,760 “contact hours” (e.g., lectures and lab times) and “preparation hours” (e.g., homework and fieldwork) and the typical 60-credit hour associate’s degree at Illinois’ community colleges requires 2,880 total hours (UIUC, 2018; College Illinois, 2015; Studyportals, 2018). Joint labor-management apprenticeship programs in construction thus require 17 percent more hours of training to graduate than employer-only construction programs, 28 percent more hours than non-construction apprenticeship programs, 27 percent more hours than four-year universities, and 154 percent more hours than two-year colleges.

### Graduation Rates in Apprenticeship Programs and Colleges and Universities in Illinois

Despite requiring more hours of training to graduate, joint labor-management apprenticeship programs in construction have completion rates that approach the comparable rates for Illinois’ four-year universities (Figure 7). The Illinois Board of Higher Education collects data on the “proportion of first-time, full-time freshmen who complete their degrees within 150 percent of catalog time,” or six-years for bachelor’s degree programs and three years for associate’s degrees (IBHE, 2019). Since the typical apprentice must complete the equivalent of four years to graduate and become a journeyworker, the six-year completion rate for apprenticeship programs is assessed and contrasted with six-year graduation rates at Illinois’ universities and three-year graduation rates at Illinois’ community college. The analysis is limited to the incoming classes of 2000 through 2011 because 2016 is the last year for which RAPIDS apprenticeship data was available; an individual entering an apprenticeship program in January 2011 would have had six full years to complete the program by December 2016.

Joint labor-management construction programs have produced a completion rate of 54 percent since 2000 (Figure 7). This completion rate is close to but below the six-year graduation rate of 61 percent for public four-year universities, such as the University of Illinois and Southern Illinois University. Joint construction programs also have a graduation rate that is below the comparable rate of 66 percent for nonprofit universities, such as Knox College and Northwestern University. However, the completion rate for joint construction programs exceeds the 43 percent graduation rate reported by for-profit institutions that operate in Illinois, such as the Taylor Business Institute and DeVry University. With graduation rates that approach most four-year universities and beat out many private colleges, joint labor-management apprenticeship programs in construction are an alternative for young individuals seeking to build an in-demand skillset upon graduating high school.

**FIGURE 7: GRADUATION RATES OF UNIVERSITIES, COLLEGES, AND APPRENTICESHIP PROGRAMS, 2000-2011 ENROLLED COHORTS**



Source(s): RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor, with only apprentices enrolled between 2000 and 2011 analyzed to assess the six-year completion rate; "Chapter 2: Awards Conferred Data" in the *IBHE Data Book* by the Illinois Board of Higher Education on "first-time, full-time freshmen who complete their degrees within 150 percent of catalog time" (IBHE, 2019).

On the other hand, employer-only construction programs have recorded a very low completion rate (Figure 7). Overall, employer-only construction programs have graduated fewer than one-in-three apprentices (31 percent) since 2000. The completion rate for employer-only construction programs is not only 12 percentage points lower than the comparable rate posted by for-profit higher education institutions, it is 30 percentage points below the graduation rate for public universities, or about half as high. Employer-only construction programs also have a graduation rate that is 29 percentage points lower than all other non-construction apprenticeship programs (60 percent).

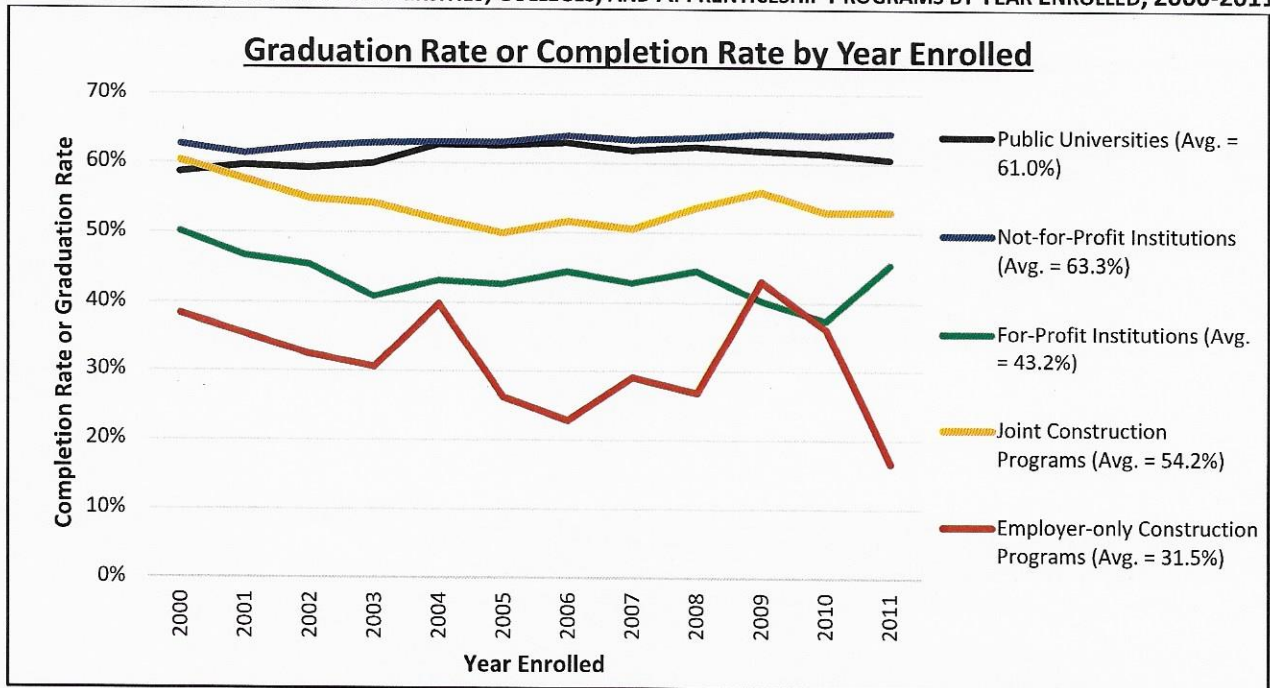
There is a stark contrast between the joint labor-management programs and employer-only programs in construction (Figure 7). Joint labor-management programs, which require 17 percent more hours of training, have a completion rate (54 percent) that is 23 percentage points higher than employer-only programs (31 percent). Completion rates are a measure of performance because registered apprentices gain journeyworker-level recognition for their hard work and study in the form of pay increases. High completion rates also mean that apprenticeship programs have successfully expended resources to train skilled workers. Low completion rates, on the other hand, represent an inefficient use of resources, with programs not recruiting, screening, and admitting committed trainees and not adequately delivering qualified craft employees for employers. For both

workers and contractors, the data shows that joint programs are substantially more successful than employer-only programs.

Joint labor-management apprenticeship programs in construction also have a more predictable supply of skilled workers (Figure 8). For the registered classes of 2000 through 2011, joint construction programs consistently maintained a completion rate of between 50 percent and 60 percent. Completion rates dipped for the registered classes of 2005 through 2007 because, on a four-year timeline, the trainees would have graduated between 2009 and 2011— which was a period of high unemployment in the labor market from a sluggish recovery after the Great Recession. With less construction activity during the economic downturn, apprentices had fewer opportunities to accumulate on-the-job hours, making it more difficult to graduate into journeyworker status. Annual completion rates rose back to the 53 percent to 56 percent range in the years that followed.

Employer-only construction programs are much more volatile than joint construction programs (Figure 8). These programs began the millennium with a relatively low completion rate of 38 percent. The completion rate fell year-after-year until the enrolled class of 2004 achieved a completion rate of 40 percent. These programs also experienced a dip in the aftermath of the Great Recession during which completion rates fell to between 23 percent and 29 percent. Then, the graduation rate reached a peak of just 43 percent for the registered class of 2009, the only year for which employer-only construction programs had a higher graduation rate than for-profit colleges in Illinois (40 percent). The completion rate for employer-only construction programs subsequently declined once again to a low of 17 percent for the registered class of 2011, 36 percentage points below the equivalent completion rate for the same cohort in joint construction programs (53 percent) (Figure 8).

**FIGURE 8: GRADUATION RATES OF UNIVERSITIES, COLLEGES, AND APPRENTICESHIP PROGRAMS BY YEAR ENROLLED, 2000-2011**



Source(s): RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor, with only apprentices enrolled between 2000 and 2011 analyzed to assess the six-year completion rate; “Chapter 2: Awards Conferred Data” in the *IBHE Data Book* by the Illinois Board of Higher Education on “first-time, full-time freshmen who complete their degrees within 150 percent of catalog time” (IBHE, 2019).

By 2016, employer-only construction programs graduated just 11 total apprentices from the enrolled class of 2011 (Figure 9). Of these, all 11 were male and eight were white, one was African American, one was Latino, and one identified with another racial background. By contrast, joint labor-management apprenticeship programs graduated 1,249 apprentices in 2016, including 46 women, 908 white apprentices, 115 African American

apprentices, and 132 Latinx apprentices. Joint construction programs graduated a higher percentage of African Americans (9 percent), Latinx apprentices (11 percent), and female apprentices (4 percent) than employer-only construction programs. While 2016 graduates from non-construction apprenticeship programs were still majority male (87 percent), they also included higher shares of African Americans (17 percent) and Latinx individuals (12 percent) than employer-only construction programs.

**FIGURE 9: APPRENTICE COMPLETERS (ENROLLED IN 2011) AND DEGREES CONFERRED BY COLLEGES AND UNIVERSITIES IN FY2017**

Apprentice Completers and FY2017 Graduates by Type of Institution	White	African American	Latinx	Men	Women	Total Graduates
Joint Construction Programs	908 72.7%	115 9.2%	132 10.6%	1,203 96.3%	46 3.7%	1,249 100.0%
Employer-Only Construction Programs	8 72.7%	1 9.1%	1 9.1%	11 100.0%	0 0.0%	11 100.0%
All Non-Construction Programs	182 55.8%	56 17.2%	40 12.3%	284 87.1%	42 12.9%	326 100.0%
Public Universities	20,009 60.4%	3,271 9.9%	3,863 11.7%	15,949 48.1%	17,190 51.9%	33,139 100.0%
Not-for-Profit Institutions	19,684 59.9%	2,368 7.2%	4,640 14.1%	13,425 40.9%	19,436 59.1%	32,861 100.0%
For-Profit Institutions	7,648 47.7%	3,013 18.8%	2,094 13.1%	4,055 25.3%	11,984 74.7%	16,039 100.0%
Public Community Colleges	39,373 60.9%	7,645 11.8%	11,352 17.6%	29,507 45.6%	35,144 54.4%	64,651 100.0%

Source(s): RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor, with completers from the cohort of apprentices enrolled in 2011 shown; "Chapter 2: Awards Conferred Data" in the *IBHE Data Book* by the Illinois Board of Higher Education on degrees conferred in Fiscal Year 2017, which includes the months of July 2016 through June 2017 (IBHE, 2019).

Although joint labor-management apprenticeship programs in construction can take steps to improve the diversity of their graduates, their racial and ethnic diversity is currently on par with public universities in Illinois (Figure 9). The African American and Latinx shares of graduates were 9 percent and 11 percent, respectively, in joint construction programs and 10 percent and 12 percent, respectively, in public universities. The share of white graduates is higher in joint construction programs (73 percent) than public universities (60 percent) but that is partially because the share of graduates from all other racial and ethnic backgrounds—most notably, Asians and Pacific Islanders—is higher in public universities (18 percent) than joint construction programs (8 percent). Overall, joint labor-management apprenticeship programs in construction are more diverse than employer-only construction programs and graduate a higher share of African Americans (9 percent) than not-for-profit universities (7 percent) in Illinois (Figure 9).

In construction, the joint labor-management apprenticeship programs have significantly higher rates of completion regardless of race, gender, or veteran status (Figure 10). Since 2000, the completion rate for male construction apprentices has been 54 percent in joint programs and 32 percent in the employer-only programs, a 22 percentage-point gap. The difference is even starker for female apprentices: 57 percent of women who enrolled in joint programs completed their training while just 7 percent did in the employer-only programs, a 50 percentage-point difference. In joint labor-management apprenticeship programs, African American apprentices have had a 52 percent completion rate and Latinx apprentices have had a 47 percent completion rate compared to 18 percent and 22 percent, respectively, in the employer-only programs. Finally, military veterans have had a high 60 percent completion rate in the joint labor-management apprenticeship programs in construction. By contrast, only 27 percent of veterans in the employer-only programs finished their programs.

**FIGURE 10: COMPLETION RATES OF CONSTRUCTION APPRENTICES BY RACE, GENDER, AND VETERAN STATUS, 2000-2011**

Type of Construction Program:	Joint Labor- Management Programs			Employer-Only Programs		
Apprentice Completers by Race, Gender, and Veteran Status	Apprentices	Completers	Completion Rate	Apprentices	Completers	Completion Rate
<b>Total (All Apprentices)</b>	<b>57,851</b>	<b>31,357</b>	<b>54.2%</b>	<b>1,281</b>	<b>403</b>	<b>31.5%</b>
Gender: Male	56,167	30,392	54.1%	1,254	401	32.0%
Gender: Female	1,684	965	57.3%	27	2	7.4%
Race: White, non-Latinx	40,707	22,874	56.2%	1062	351	33.1%
Race: African American	5,005	2,604	52.0%	51	9	17.6%
Race: Latinx	10,772	5,065	47.0%	136	30	22.1%
Status: Military Veteran	3,272	1,953	59.7%	106	29	27.4%

Source(s): RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor, with only apprentices enrolled between 2000 and 2011 analyzed to assess the six-year completion rate.

A statistical tool called a probit regression is utilized to examine which factors impact the probability that an individual apprentice will graduate from a construction training program. Using average marginal effects, the technique describes “how much” a variable is responsible for increasing or decreasing the completion rate. The analysis accounts for other factors that may influence the likelihood of a registered apprentice completing his or her program, such as whether the person graduated high school and his or her demographic characteristics.

Analytical results are shown in Figure 11. The factor that statistically has the greatest impact on whether an individual successfully completes a construction apprenticeship program in Illinois is whether the program is sponsored jointly by contractors and unions (Figure 11). Registered apprentices are 22 percentage points more likely to graduate, on average, if they are enrolled in joint labor-management apprenticeship programs. This result is statistically significant at the 99 percent confidence level.

Additionally, an extra 1,000 hours of on-the-job and classroom training is associated with a 5 percentage-point increase in the graduation rate, a result that is also statistically significant with 99 percent confidence (Figure 11). The most skilled construction trades have apprenticeship programs that require more hours but also tend to have the highest completion rates. This may be because higher-skilled trades generally pay higher wages, increasing the motivation of an apprentice to graduate. It may also be that the programs with longer durations have a larger incentive to recruit and admit only high-quality applicants so that they do not waste valuable resources on individuals who are likely to cancel their apprenticeships or leave for another trade or career. In any case, joint labor-management programs require more hours of training than employer-only programs on average, and longer durations are associated with higher completion rates.

Other factors have a noticeable effect on the probability of a construction apprentice graduating to become a journeyworker (Figure 11). Even though women are much less likely to apply to and enroll in a construction training program, female apprentices are 4 percentage points more likely to graduate, on average, than male apprentices. Similarly, military veterans are 4 percentage points more likely to graduate from a construction apprenticeship program than non-veterans, indicating that the structured environment and the camaraderie associated with the building trades may be an attractive option for veterans returning to civilian life. Apprentices who have earned (at least) a high school diploma are also 4 percentage points more likely to complete construction apprenticeship programs; applicants who dropped out of high school might also be more likely to drop out of apprenticeship programs. Workers who enroll when they are between the ages of 16 years old and 24 years old are also 2 percentage points less likely to complete their programs than older workers. This is likely due to the lack of experience as young people sort out the “right” career path for them. Nevertheless, the data suggests that construction apprenticeship programs are a viable alternative to college for Illinois’ youth.

**FIGURE 11: PROBIT REGRESSION ON THE PROBABILITY OF A CONSTRUCTION APPRENTICE COMPLETING TRAINING IN ILLINOIS**

Probability of a Registered Apprentice Completing a Construction Apprenticeship Program	Average Marginal Effect (Standard Error)
<b>Joint Labor-Management Program</b>	<b>+0.220***</b> <i>(0.014)</i>
Duration: Additional 1,000 Hours	+0.047*** <i>(0.001)</i>
Gender: Male	-0.037*** <i>(0.012)</i>
Race: White, non-Latinx	+0.041*** <i>(0.004)</i>
Age: 16-24 Years Old	-0.021*** <i>(0.006)</i>
Age: 25-34 Years Old	-0.010 <i>(0.007)</i>
Age: 45-54 Years Old	-0.002 <i>(0.013)</i>
Age: 55 Years or Older	+0.038 <i>(0.032)</i>
Education: High School Graduate	+0.035*** <i>(0.007)</i>
Year Enrolled: 2001	-0.022*** <i>(0.008)</i>
Year Enrolled: 2002	-0.043*** <i>(0.008)</i>
Year Enrolled: 2003	-0.050*** <i>(0.009)</i>
Year Enrolled: 2004	-0.078*** <i>(0.009)</i>
Year Enrolled: 2005	-0.103*** <i>(0.009)</i>
Year Enrolled: 2006	-0.086*** <i>(0.009)</i>
Year Enrolled: 2007	-0.089*** <i>(0.008)</i>
Year Enrolled: 2008	-0.067*** <i>(0.009)</i>
Year Enrolled: 2009	-0.004 <i>(0.012)</i>
Year Enrolled: 2010	-0.034*** <i>(0.013)</i>
Year Enrolled: 2011	-0.055*** <i>(0.011)</i>
Constant	0.538*** <i>(0.002)</i>

Source(s): Authors' analysis of RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor based on apprentices enrolled between 2000 and 2011. \*\*\*p≤|0.01|; \*\*p≤|0.05|; \*p≤|0.10|; N= 58,912; Pseudo r<sup>2</sup>= 0.032.

On the other hand, white non-Latinx apprentices are statistically 4 percentage points more likely to graduate from construction apprenticeship programs than people of color (Figure 11). One way for the trades—both union and nonunion alike—to improve racial diversity would be to develop initiatives to increase the completion rate for people of color who are already in their programs. This includes creating mentoring programs, retaining counselors to address challenges unique to people of color, and hiring more minority journeyworkers to teach courses and serve as positive role models (Bruno et al., 2016). Research has shown that lower-performing African American and white students benefit from being assigned to race-congruent teachers (Egalite et al., 2015; Dee, 2004). In addition, construction apprenticeship programs should update their diversity education and move beyond the “lawsuit avoidance” approach that is customarily undertaken (Bruno et al., 2016).

Finally, the year of an apprentice’s registration appears to have influenced the probability that an individual completed a construction training program (Figure 11). In particular, the likelihood of completing an apprenticeship program was statistically 10 percentage points lower for an apprentice who enrolled in 2005 than for an apprentice who enrolled in 2000. Apprentices who enrolled in 2006 and 2007 experienced a 9 percentage point reduction in the chance that they graduated to journeyworker status, as compared to those who registered in 2000. This again indicates that the Great Recession lowered completion rates, while boom years tended to have higher completion rates.

It may be worth noting the construction apprenticeship programs that have discernibly higher-than-average and lower-than-average completion rates (Figure 12). The joint apprenticeship program sponsored by the Illinois Chapter of the National Electrical Contractors Association (NECA) and the International Brotherhood of Electrical Workers Local 134 has a completion rate of 78 percent since 2000. Located in Alsip, Illinois, the IBEW NECA Technical Institute offers a five-year program to train electricians to assemble, install, maintain, and test electrical equipment and wiring systems in residential, commercial, industrial, and renewable energy settings. The school offers both day classes and night classes for electricians apprentices. Moreover, the Apprenticeship and Skill Improvement Program (ASIP) sponsored by the International Union of Operating Engineers Local 150 and signatory contractors has graduated 73 percent of its apprentices since 2000. Located in Wilmington, Illinois, the ASIP facility has 342,000 square feet of training space and had \$15.7 million in functional expenses in fiscal year 2015 to train apprentices how to operate machines such as cranes, bulldozers, rollers, backhoes, and graders to build roads, bridges, tunnels, power plants, refineries, railroads, quarries, utility lines and other heavy construction projects (Bruno & Manzo, 2016). These programs had statistically higher completion rates than the 52 percent rate for the rest of the joint labor-management construction programs. In comparison, the Illinois Chapter of the Associated Builders and Contractors (ABC) graduated just 16 percent of the apprentices it enrolled since 2000, noticeably lower the completion rate for other employer-only construction programs (37 percent) and far below the joint labor-management programs (Figure 12).

**FIGURE 12: COMPLETION RATE FOR APPRENTICES ENROLLED BETWEEN 2000 AND 2011, SELECTED PROGRAMS IN ILLINOIS**

Apprentice Completers by Construction Apprenticeship Program	Completion Rate
<u>Joint Labor-Management Programs</u>	
IBEW NECA Technical Institute	78.2%
IUOE Local 150 Apprenticeship and Skill Improvement Program (ASIP)	73.0%
All Other Joint Construction Programs	52.1%
<u>Employer-Only Programs</u>	
Illinois Chapter of the Associated Builders and Contractors (ABC)	16.1%
All Other Employer-Only Programs	36.8%

Source(s): RAPIDS data for apprenticeships in Illinois between 2000 and 2016 by the Office of Apprenticeship at the U.S. Department of Labor. Completion rates only shown for apprentices enrolled between 2000 and 2011.

## The Earnings Potential of Apprentices Compared with College-Educated Workers in Illinois

Registered apprentices in joint labor-management construction programs earn higher training wages than apprentices in employer-only construction programs (Figure 13). At the time of entry, the average registered apprentice in joint construction programs earns \$19.15 per hour (in inflation-adjusted 2018 dollars). First-year apprentices in joint construction programs earn 16 percent more than their counterparts in employer-only construction programs (\$16.54 per hour). Apprentices in all other non-construction programs start out at \$14.25 per hour on average.

The earnings growth potential is also higher for registered apprentices in joint construction programs (Figure 13). While compensation varies by program, joint labor-management programs usually start at a base wage of 50 percent of the corresponding journeyworker that progressively increases at each year of training.<sup>1</sup> Upon completion, the average worker graduating from a joint construction program earns \$40.40 per hour, a little more than double the entry wage (111 percent). By contrast, the average exit wage of an apprentice enrolled in an employer-only construction program is \$23.46 per hour, a wage growth of 42 percent. Union journeyworkers earn 72 percent more per hour than those who graduate from employer-only programs, creating a strong financial incentive for high-quality candidates to apply for and complete the more rigorous joint labor-management construction programs.

Joint labor-management programs in construction offer a strong alternative for skilled workers in Illinois to earn a competitive wage (Figure 13). Right away, first-year apprentices in joint construction programs earn 33 percent more (\$19.15 per hour), on average, than young Illinois workers with only high school diplomas (\$14.44 per hour). They also earn a base wage that is similar to young workers who have already earned a two-year associate's degree (\$19.39 per hour). Importantly, registered apprentices earn that \$19.15 per hour from the initial moment of training, while the average young resident seeking a bachelor's degree must first attain the degree before earning a middle-class income.

**FIGURE 13: AVERAGE WAGES FOR ILLINOIS WORKERS BY APPRENTICESHIP PROGRAM OR EDUCATIONAL ATTAINMENT, 2018**

Average Hourly Income by Apprenticeship Program or Education	Starting Wage	Mid-Career Wage
<u>Apprenticeship Program</u>	<u>First-Year Wage</u>	<u>Journeyworker Wage</u>
Joint Labor-Management (Union) Construction Apprentices	\$19.15	\$40.40
Employer-Only (Nonunion) Construction Apprentices	\$16.54	\$23.46
All Other Non-Construction Registered Apprentices	\$14.25	\$32.77
<u>Educational Degree</u>	<u>Earnings: Ages 16-30</u>	<u>Earnings: Ages 31-60</u>
Workers with Only High School Diplomas or Equivalents	\$14.44	\$22.95
Workers with Associate's Degrees	\$19.39	\$25.77
Workers with Bachelor's Degrees	\$26.00	\$35.28
Workers with Advanced (Master's, Doctorates, Professional) Degrees	\$32.30	\$44.42

Source(s): RAPIDS data for 2016 apprenticeships in Illinois by the Office of Apprenticeship, with wages for the enrolled class of 2016 adjusted to constant 2018 dollars using the Consumer Price Index by the Bureau of Labor Statistics (BLS, 2019a); 2018 data for Illinois from the *Current Population Survey Outgoing Rotation Groups* (CPS ORG) released by the Bureau of Labor Statistics (CEPR, 2019). All data sources originate from the U.S. Department of Labor.

All union journeyworkers of the same trade operating the same machinery in the same local area (e.g., a county) earn the same wage, per their collective bargaining agreements. Regardless of age, gender, sex, sexual orientation, racial identification, ethnic background, religious preference, or any other characteristic unique to

<sup>1</sup> One example of an apprenticeship wage schedule is the electrical apprenticeship program at the IBEW NECA Technical Institute. First-year apprentices earn wages equal to 40 percent of the journeyman wireman (JW) rate (\$19.74 per hour). After six months, they earn 45 percent of the JW rate. In the second year, they earn 50 percent for the first six months and 55 percent in the second six months. The third year is 60 percent and 65 percent, the fourth year is 70 percent and 75 percent, and the fifth year begins at 80 percent before rising to 90 percent six months prior to successful completion. After graduating from the five-year program, a journeyman wireman earns \$49.35 per hour (EJATT, 2019).



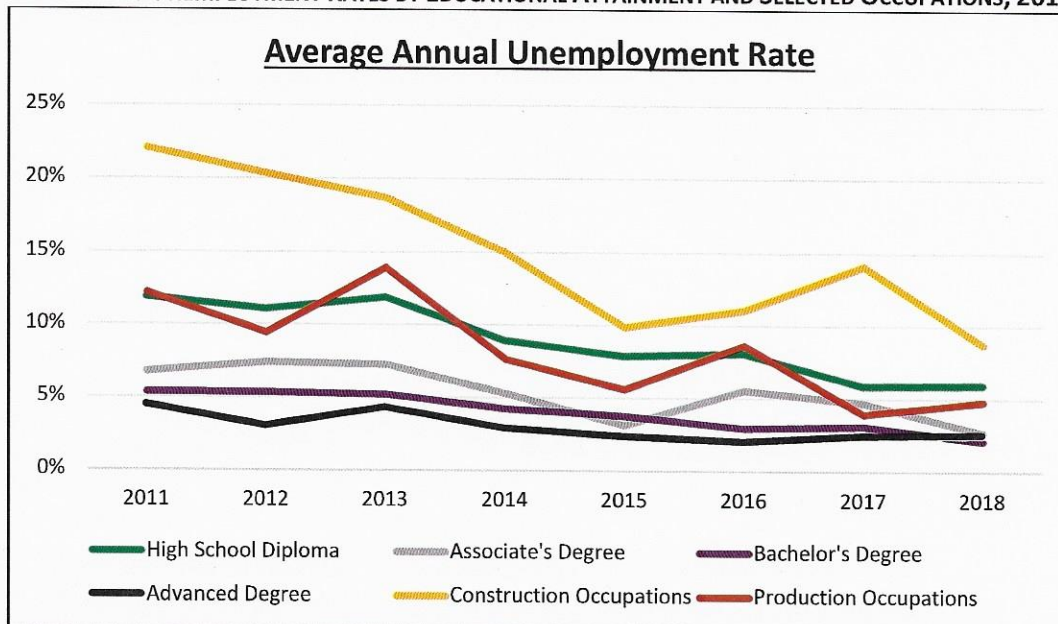
an individual, all able-bodied journeyworkers who have proven that they have mastered their crafts earn the exact same hourly income—significantly reducing inequality in the construction industry (Manzo & Bruno, 2014). For this reason, the \$40.40 per hour average exit wage for apprentices from joint construction program can also be interpreted as their expected mid-career wage as journeyworkers.

The average wage for journeyworkers who completed joint construction programs (\$40.40 per hour) compares favorably to mid-career hourly incomes for college-educated workers (Figure 13). The average mid-career wage of workers with associate’s degrees is \$25.77 per hour in Illinois. Mid-career earnings for those with bachelor’s degrees amount to \$35.28 per hour while the analogous income is \$44.42 per hour for those with advanced degrees such as a Master of Business Administration (M.B.A.), Juris Doctor (J.D.), or Doctor of Philosophy (Ph.D.). The average union construction worker earns 15 percent more *per hour* than workers with bachelor’s degrees and 9 percent less *per hour* than workers with advanced degrees.

This does not necessarily mean that unionized construction journeyworkers have higher *annual* incomes than workers with bachelor’s degrees. Construction is the most volatile major industry in Illinois and the United States. Employment in the industry is seasonal in nature, with major projects built and repaired during peak months with desirable weather. Construction work is also cyclical and contingent upon both private market conditions and public sector investments. When workers finish a project, there is often a period of unemployment while they look for another job, sometimes with new employers.

As a result, the unemployment rate for workers in construction occupations is persistently higher than the rest of the state (Figure 14). The unemployment rate for Illinois’ construction workers was 8.8 percent in 2018, down from 22.0 percent in 2011 but above the comparable rate for workers with only high school diplomas or their equivalents (5.9 percent). The 2018 unemployment rate in Illinois was between 2.1 percent and 2.7 percent for workers with associate’s, bachelor’s, and advanced degrees—significantly lower than for workers in construction occupations. Similarly, the 2018 unemployment rate for Illinois’ production workers, such as machinists and assemblers in manufacturing plants, was 4.8 percent. Unemployment in construction occupations is not only consistently higher than the rest of Illinois, it is considerably higher following economic recessions, as illustrated by elevated unemployment rates experienced in the early 2010s (Figure 14).

**FIGURE 14: ILLINOIS UNEMPLOYMENT RATES BY EDUCATIONAL ATTAINMENT AND SELECTED OCCUPATIONS, 2011-2018**



Source(s): 2011-2018 data for Illinois from the *Current Population Survey Outgoing Rotation Groups* (CPS ORG) released by the Bureau of Labor Statistics at the U.S. Department of Labor (CEPR, 2019).

Overall, the most-recent *Economic Census of Construction* reports that the average construction worker in Illinois' heavy and civil engineering construction sector only works 1,787 hours in a year (Census, 2019). This is 14 percent fewer hours than the standard full-time workload of 2,080 hours. At \$40.40 per hour over 1,787 hours, a unionized construction journeyworker would take home an annual income of \$72,195 before taxes. For comparison, the U.S. Bureau of Labor Statistics estimates that the average high school teacher earns \$72,370 per year, the average architect earns \$79,520 per year, and the average firefighter earns \$56,710 per year in Illinois (BLS, 2019b). A joint labor-management apprenticeship program in construction offers a career pathway into a trade that is solidly positioned within Illinois' middle class.

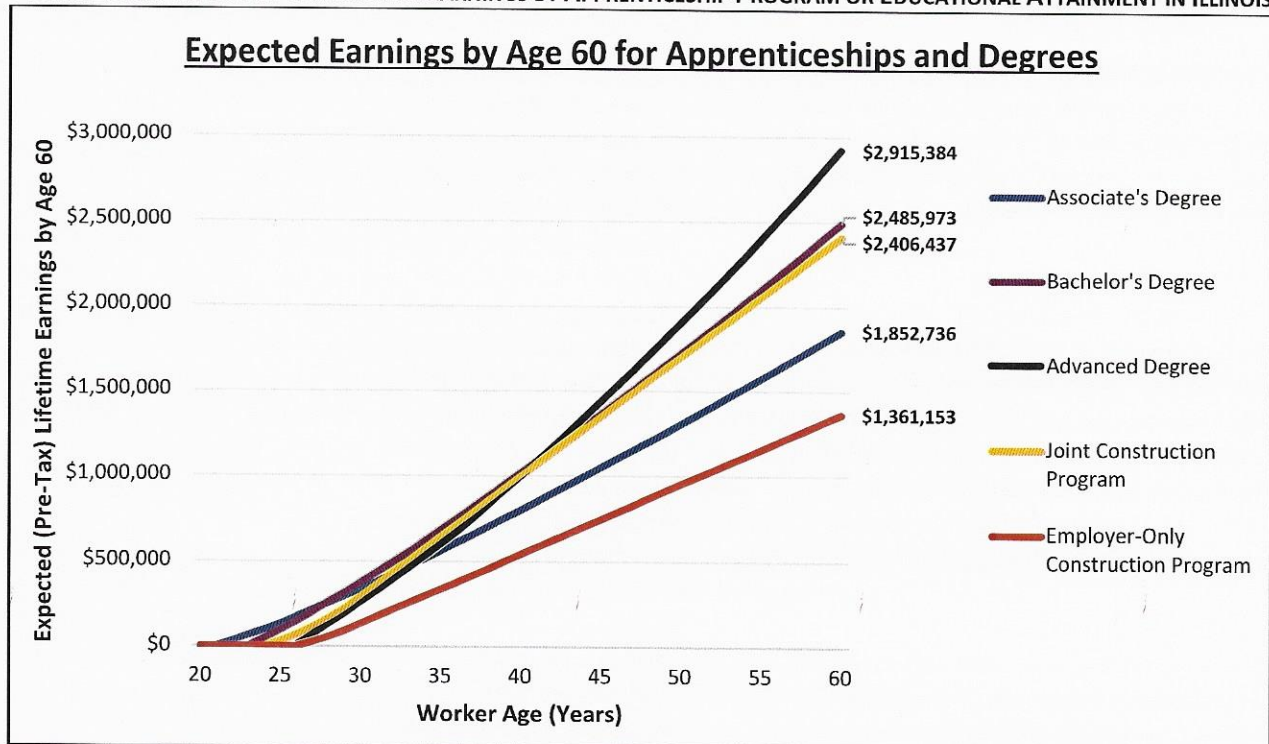
Figure 15 displays a stylized example of the impact of successfully completing a construction apprenticeship program on a worker's lifetime earnings in Illinois. Values for construction apprentices are in constant 2018 dollars and are based on 1,600 work-hours per year during the worker's years as an apprentice and 1,720 annual hours as a journeyworker, which approximates the average hours worked by employed construction workers combined with the higher probability of an individual construction worker suffering from an unemployment spell. This "smooths out" expected pre-tax lifetime earnings into a straight trendline. Although the average apprentice in a joint construction program is 27.2 years old at the time of enrollment, the median age of a first-year apprentice is 25 years old. The average apprentice in an employer-only construction program is 29.6 years old, with a median age of 27. Accordingly, the forecasted earnings from completing a joint construction program begin at age 25 while impacts for an employer-only program begin at age 27.

Expected pre-tax lifetime earnings for a worker completing a construction apprenticeship program are compared in this illustration to a worker successfully graduating from college with one of three degrees: an associate's degree, a bachelor's degree, or an advanced degree. Values by educational attainment are also in constant 2018 dollars and are for students who complete their degrees within 150 percent of the expected time (e.g., six years for bachelor's degrees). Expected annual hours of employment are based on historical data for hours worked and unemployment rates by level of educational attainment in Illinois. In addition, the graph accounts for the average student loan debt at graduation. As of 2019, the average debt at graduation was \$19,600 for associate's degree recipients, \$29,900 for bachelor's degree recipients, and \$66,000 for advanced degree recipients (Kantrowitz, 2019a). The analysis assumes a 10-year payoff period at an average of 6 percent interest on the student loans, equating to total repayments of \$26,112 for workers with associate's degrees, \$39,834 for workers with bachelor's degrees, and \$87,929 for workers with advanced degrees (Kantrowitz, 2019b).

After accounting for the average debt at graduation, an Illinois worker attaining a bachelor's degree is expected to earn \$2.49 million in total pre-tax earnings (in constant 2018 dollars) by the time he or she reaches 60 years old, or an average of about \$67,200 annually over 37 years post-graduation (Figure 15). Similarly, an Illinois worker who has achieved an advanced degree is expected to earn \$2.92 million over his or her career, averaging around \$85,700 per year over 34 years in the labor force. An associate's degree yields \$1.85 million in total earnings. Compared to holding a bachelor's degree, workers with advanced degrees tend to earn 17 percent more pre-tax by the time they are 60 years old and workers with associate's degrees generally earn 25 percent less.

For young Illinois residents, a registered apprenticeship in a joint construction program offers a viable post-secondary option that parallels a bachelor's degree (Figure 15). A worker completing a joint construction program is expected to earn \$2.41 million in lifetime earnings on average by the time he or she reaches 60 years old (in constant 2018 dollars). This amounts to about \$44,800 in annual income from wages over five years of apprenticeship and an estimated \$70,400 per year over 31 years as a journeyworker. Despite a higher likelihood of suffering an unemployment spell, a typical unionized construction journeyworker in Illinois only earns 3 percent less than the average worker with a bachelor's degree in the state.

FIGURE 15: EXPECTED PRE-TAX LIFETIME EARNINGS BY APPRENTICESHIP PROGRAM OR EDUCATIONAL ATTAINMENT IN ILLINOIS



Source(s): Stylized projections based on reported apprentice wages and journeyworker wages adjusted for inflation to 2018 dollars, average hourly incomes for workers grouped educational attainment, historical estimates for annual hours of employment, historical estimates for unemployment rates, and average debt at graduation for students attending colleges. 2016 RAPIDS data by the Office of Apprenticeship; Consumer Price Index calculator by the Bureau of Labor Statistics (BLS, 2019a); 2012 *Economic Census of Construction* data from the U.S. Census Bureau (Census, 2019); 2011-2018 *Current Population Survey Outgoing Rotation Groups* (CPS ORG) data by the Bureau of Labor Statistics (CEPR, 2019); and data on average debt at graduation (Kantrowitz, 2019a; Kantrowitz, 2019b).

Conversely, a construction worker completing an apprenticeship at an employer-only program earns 45 percent less over his or her lifetime than a worker with a bachelor's degree (Figure 15). A nonunion construction journeyworker is only expected to earn \$1.12 million in total wages by the time he or she reaches age 60, or a 34-year average of \$40,000 annually (in constant 2018 dollars). In Illinois, \$40,000 is a lower-middle class income for a full-time worker (Manzo & Manzo, 2018). It is also nearly double the \$21,330 federal poverty line for a family of three, so employer-only programs help the 31 percent of apprentices who complete their programs find modest employment opportunities (ASPE, 2019). However, employer-only programs fare worse in terms of expected pre-tax lifetime earnings than associate's degree programs (-27 percent) and bachelor's degree programs (-45 percent). For young high school graduates in Illinois who are seeking other post-secondary possibilities to develop a marketable skillset outside of a four-year bachelor's degree, the best option may be to consider applying for a joint labor-management apprenticeship program in construction.

### Policy Implications for Illinois

Not all young people are able or willing to earn college degrees. For many, the path to the middle class is through registered apprenticeship programs, particularly in the construction trades. Registered apprenticeship programs should thus be expanded to enhance worker skills, improve productivity and safety, and raise wages in Illinois. High schools and community colleges, private apprenticeship programs, and elected officials can all take steps to encourage apprenticeship programs as a viable alternative to college for Illinois' youth.

First, pre-apprenticeship programs should be expanded in public high schools and community colleges. Currently, 48 percent of Illinois contractors and 81 percent of contractors across the Midwest report difficulty in

finding qualified workers to fill craft positions (AGC, 2019). To address this shortage of skilled workers, the State of Illinois should partner with existing apprenticeship programs to increase pre-apprenticeship training course offerings at public high schools and community colleges, especially in low-income communities. These partnerships should offer skills training and information about careers in apprenticeable occupations (Olinsky & Ayers, 2013). Benito Juarez Community Academy and Prosser Career Academy in Chicago can serve as models for the rest of the state. In these high schools, 15 students are expected to be accepted into the IBEW Local 134 pre-apprenticeship program as part of the Solar Craft Apprenticeship Program to prepare young workers from disadvantaged backgrounds for careers in the expanding clean energy sector (ISEA, 2018). As part of this expansion, the State of Illinois should remove any perception of a stigma associated with choosing trade school over college (St-Esprit, 2019). Educating students, parents, teachers, and counselors about apprenticeship programs and addressing misconceptions about the trades can help Illinois residents understand that vocational training may be a better path to a stable job for many workers than a college degree.

Apprenticeship programs should develop initiatives that increase the completion rate of apprentices from disadvantaged backgrounds. Registered apprenticeship programs are a proven way to lift blue-collar workers into the middle class, regardless of background. Joint labor-management programs are more racially diverse than employer-only programs, but both segments of the industry can make further efforts to diversify. The construction industry can improve racial and ethnic diversity by creating mentoring programs within apprenticeship programs, retaining counselors to address challenges unique to people of color, and hiring more minority journeyworkers to teach courses and serve as positive role models (Bruno et al., 2016).

The State of Illinois should expand access to child care and early childhood education programs to increase female participation in the trades. Women report that the lack of access to affordable child care is a barrier to participating in registered apprenticeship programs. In construction, for example, apprentices often wake up very early to travel to a worksite, receive on-the-job training all day, and then attend classroom instruction after work (Reed et al., 2012). Expanding early childhood education programs has been found to boost employment, especially among women (Manzo & Bruno, 2015; Schocet, 2019).

The State of Illinois should also promote the new apprenticeship education expense tax credit (Blaze et al., 2019). In August 2019, Illinois Governor J.B. Pritzker signed Senate Bill 1591, incentivizing employers to assist apprentices with tuition through a tax break. The law provides a nonrefundable tax credit up to \$3,500 for tuition, books, and fees per apprentice per year that can reduce a business' income tax liability. The credit may be increased to \$5,000 if either the business address or the apprentice's home address is located in an underserved area. This credit, which will be available between 2020 and 2024, can be claimed by all employers participating in USDOL-approved apprenticeship programs. Importantly, the tax credit is not limited to the construction industry. Research suggests that 50 percent of the job openings created in Illinois by the end of 2024 will be in "middle-skill" positions—which require education beyond high school but not a four-year degree—but only 42 percent of Illinois' labor force is trained to the middle-skill level (NSC, 2017). The apprenticeship expense tax credit can help employers find and train workers to fill these jobs.

Finally, the State of Illinois should promote joint labor-management apprenticeship programs and nurture them in industries outside of construction. Joint labor-management programs in construction account for 83 percent of all registered apprentices in Illinois. These programs are bolstered by the state's prevailing wage law, which increases apprenticeship training by as much as 8 percentage points, boosts worksite productivity by between 14 percent and 33 percent, and encourages skilled young workers to enter the trades (Bilginsoy, 2005; Philips, 2014; Manzo et al., 2016). Additionally, while there has been a federal movement to establish industry-recognized apprenticeship programs (IRAPs) that would allow industry groups, associations, and schools to establish criteria for apprenticeship curricula and requirements, the construction industry should be exempt from this new system. IRAPs would not include a contractual agreement between apprentices and program sponsors and would not guarantee progressively higher wages for apprentices as their skills increase (Prebil &

Tesfai, 2019). If allowed in construction, IRAPs could impose lower standards of quality and craftsmanship (Goodman, 2019). Rather than depressing standards, other industries should look to replicate the joint-labor management apprenticeship model— not weaken it. The State of Illinois should challenge any federal action that undermines its most successful apprenticeship programs.

## Conclusion

Joint labor-management apprenticeship programs account for the vast majority of registered apprentices in Illinois' construction industry. These programs are significantly more rigorous than employer-only construction programs and require more hours of on-the-job and classroom training than a typical bachelor's. However, despite requiring more hours of training to graduate, joint construction programs have a completion rate that rivals four-year universities and is 22 percentage points higher, on average, than employer-only programs.

Registered apprenticeship programs produce good middle-class careers and should be encouraged as a viable alternative to college. Journeyworkers graduating from joint labor-management construction programs earn about \$40 per hour, resulting in lifetime incomes that parallel the average for workers with bachelor's degrees. To expand registered apprenticeships, Illinois should include pre-apprenticeship programs at public high school and community colleges, develop initiatives that improve the completion rate of apprentices, expand access to child care to increase female participation, promote the new apprenticeship education expense tax credit, and support joint labor-management programs by challenging any federal action that could undermine them.

For many young people, the path to the middle class is through an "earn while you learn" registered apprenticeship program. In particular, the unionized construction trades have rigorous programs with training hours, graduation rates, and competitive pay that rival four-year universities in Illinois. Education pays, but so too does a registered apprenticeship program.

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