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The Impact of Apprenticeship Programs in Illinois:

An Analysis of Economic and Social Effects

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Robert Bruno, PhD and Frank Manzo IV, MPP

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By Robert Bruno, PhD and Frank Manzo IV, MPP

EXECUTIVE SUMMARY

Construction is the fastest-growing industry in Illinois. Over the next decade, the construction industry is projected to expand by 12.4 percent in Illinois, adding over 25,000 new jobs. At this pace, construction employment will grow at twice the pace of the overall state economy. All of the fastest-growing trades in Illinois's construction industry require at least 3 years of apprenticeship training.

For many young Illinois workers, enrolling in a registered apprenticeship program is a better option than attending college or university. The annual income gain from participating in a registered apprenticeship program is $3,442 on average, or $119,850 in additional income over the course of the worker's career after accounting for out-of-pocket upfront costs. In Illinois, this impact on wages is greater than the average effect of having an associate's degree ($542 per year) and many bachelor's degrees– including social work ($3,199 per year), English language and composition ($2,521 per year), and linguistics and foreign languages ($2,338 per year).

If all registered apprenticeship programs for construction were combined, they would be the 7th-largest private post-secondary educational institution in Illinois. In FY2015, there were 10,811 participants in registered apprenticeship programs in Illinois' construction industry. Cumulatively, those programs invested over $136 million in worker skills upgrading and development, which equates to $0.56 per hour worked for all blue-collar construction workers in the state. The average out-of-pocket expenditure for apprentices amounts to $4,056 over four years, compared to average student debt repayments totaling over $36,000 for Illinois residents graduating from a 4-year university.

Joint labor-management apprenticeship programs account for the vast majority of human capital investment in Illinois' construction industry. In FY2015, 98.5 percent of all construction apprentices were enrolled in joint programs by union contractors. Joint labor-management apprenticeship programs also comprise 99.2 percent of all privately-funded apprenticeship expenditures in Illinois. Additionally, joint labor-management programs in construction differ from their nonunion counterparts in many significant ways:

- Average program expenditures per apprentice are $12,715 in joint labor-management programs and only $6,585 in nonunion programs;
- Joint labor-management programs average 3.7 registered apprentices per program employee while nonunion programs have 14.7 apprentices per program employee;
- The share of women and people of color is 30.8 percent in joint labor-management programs but just 27.9 percent in nonunion programs.

Registered apprenticeship programs in Illinois' construction industry generate substantial economic benefits to the state every year. The programs directly provide 2,871 jobs for instructors and other employees. Through program expenditures and the net on-the-job earnings of participants, registered apprenticeship programs save or create nearly 5,000 total jobs in Illinois and annually boost the state's economy by $408.7 million. Over one year, the economic return on investment (i.e., the ratio of the GDP

effect to program expenditures) is $3.00 per dollar spent on worker training. Registered apprenticeship programs in construction also increase state and local tax revenues by $28.6 million every year.

Registered apprenticeship programs have even larger impacts over the long run. Registered apprenticeship programs in Illinois' construction industry provide $1.25 billion in long-term economic benefits to the state. Over the careers of program participants, the federal government receives $101.4 million in additional tax revenues and state and local government tax revenue increases by $98.7 million. The programs also result in significant taxpayer savings, including a $27.1 million reduction in unemployment insurance compensation, a $17.7 million drop in food stamp spending, and a $5.5 million decrease in welfare costs. Over 36 years, the economic return on investment from these construction programs is $9.14 per dollar spent on worker training. The return on investment is even greater if government revenue and savings are included: $10.98 per dollar invested.

While the construction industry accounts for 89.2 percent of all registered apprentices in Illinois, the economic benefits of registered apprenticeships could be expanded into many other sectors. The United States Department of Labor lists 1,060 "apprenticeable occupations," of which only 121 are in construction (11.4 percent). The average time to complete an apprenticeship is 5,631 hours in accredited non-construction programs compared to 6,120 hours for the average construction program. From fast-growing occupations such as home health aides, nurse assistants, and computer programmers to traditional occupations like truck drivers, machinists, and corrections officers, there is substantial opportunity and an increasing need for apprenticeship programs to improve worker productivity, support the middle class, and grow the economy.

The State of Illinois can enact six potential public policies to promote registered apprenticeship programs. The State of Illinois should:

1. Improve marketing and outreach to businesses and disadvantaged workers;
2. Expand access to child care programs to boost female participation;
3. Provide tax credits to businesses that offer apprenticeship programs;
4. Expand pre-apprenticeship programs in public high schools and support comprehensive trades programs such as the innovative new initiative at Dunbar Vocational High School on the south side of Chicago;
5. Encourage public universities to develop degree completion programs for eligible apprentices by awarding college credits for classroom hours earned during apprenticeship programs; and
6. Support policies that increase unionization and strengthen prevailing wage.

Apprenticeship programs have positive social and economic impacts in Illinois. The programs benefit workers by improving their skills and growing their incomes. The programs also benefit employers by addressing skills shortages through a supply of safe, productive workers. Funded almost entirely through partnerships between employers and labor unions, apprenticeship programs in construction also benefit the public by ensuring high-quality infrastructure and products, growing the state economy by $1.25 billion over the long run, and improving the budgets of state and local governments.

TABLE OF CONTENTS

ABOUT THE AUTHORS

Robert Bruno, PhD is a Professor at the University of Illinois at Urbana-Champaign School of Labor and Employment Relations and the Director of the School's Labor Education Program. He also directs the Project for Middle Class Renewal at the University of Illinois at Urbana-Champaign. His research focuses broadly on working-class, middle-class, and union studies issues. He earned his Doctor of Philosophy in Political Theory from New York University and his Master of Arts in Political Science from Bowling Green State University. He can be contacted at bbruno@illinois.edu.

Frank Manzo IV, MPP is the Policy Director of the Illinois Economic Policy Institute (ILEPI). He earned a Master of Public Policy from the University of Chicago Harris School of Public Policy, a Bachelor of Arts in Economics and Political Science from the University of Illinois at Urbana-Champaign, and an Advanced Certificate of Labor Studies from the University of Illinois. He specializes in labor market analysis, economic development, infrastructure investment, the low-wage labor force, and public finance. He can be contacted at fmanzo@illinoisepi.org.

BACKGROUND INFORMATION

Introduction

Registered apprenticeships are training programs that help businesses in Illinois find skilled workers that are in high demand. They offer both structured, on-the-job training and certified classroom instruction tailored to the needs of employers. By developing skills and human capital, apprenticeship programs create pathways to middle-class careers for young adults and workers who are unable to receive a college degree. There are over 12,000 active apprentices in Illinois.

In 1937, Congress created the formal system of registered apprenticeship through the National Apprenticeship Act. Under this system, apprenticeship programs must meet state and federal standards for completers to become certified. Apprenticeship requirements are often competency- and time-based. Apprenticeships typically last about four years, but can range between one and six years.

Nearly all registered apprenticeship programs are funded and operated by private entities. Employers, joint labor-management groups, and unions all sponsor programs, covering on-the-job and tuition costs. Participating apprentices get the opportunity to "earn while they learn" with minimal or no out-of-pocket costs. In return for this significant investment, employers have access to a pool of skilled, productive, and safe workers to build high-quality infrastructure or products.

Despite the presence of registered apprenticeships in many Illinois industries, especially construction, little policy research has been conducted to analyze their economic and social impacts. This study, authored jointly by the Project for Middle Class Renewal at the University of Illinois at Urbana-Champaign and the Illinois Economic Policy Institute, investigates the effect of registered apprenticeship programs on the workers, businesses, governments, and economy of Illinois.

The report begins with a review of the existing literature on apprenticeship programs and an explanation of the data and methodology used in this analysis. A discussion about projected construction employment growth ensues. Then, a full evaluation of the impact of construction apprenticeships follows– complete with an overview of registered apprenticeship programs in Illinois, estimates on their annual and long-term economic effects, and a comparison of construction apprenticeships with other levels of educational attainment. Finally, an implications chapter closes out the report. In this chapter, other "apprenticeable occupations" are presented before six potential policy recommendations are offered to expand registered apprenticeship programs across the state. A concluding section recaps key findings.

Literature Review on Apprenticeship Programs

There is a general consensus in the economic research that registered apprenticeship programs have positive impacts on personal economic benefits and "school-to-work" transitions (Samek Lodovici et al., 2013). Countries that have widespread usage of apprenticeship programs are more successful at transitioning young workers into the labor market. Whereas young workers in Denmark and Germany tend to have higher employment rates in stable jobs due to apprenticeship programs, their counterparts in Belgium, France, Italy, Portugal, and Spain are more likely to work in temporary jobs because training systems in their countries are weaker. In addition, compared to associate's degree equivalents,

apprenticeship programs have been found to increase the probability of having a job in Switzerland, the United Kingdom, Germany, and France (Bertschy et al., 2009; Ryan, 2000; Ryan, 1998).

Academic studies are nearly unanimous in finding that apprenticeships boost the earnings of workers with low levels of education. The bulk of this research originates from economists and policy researchers in Europe. Studies have found that the average apprenticeship program increases a worker's wages by between 5 percent (Fersterer et al., 2008) and 18 percent (McIntosh, 2007). In Germany, where apprenticeships are prevalent, the annualized wage return associated with apprenticeships has been estimated at 8 percent (Clark & Fahr, 2002). The economic research, however, does not show that apprenticeships benefit workers with high levels of education (Samek Lodovici et al., 2013).

While there are both costs and benefits of registered apprenticeship programs, the benefits are almost always found to exceed the costs. Although individuals receive lower wages while in training and contribute other upfront costs, the improvements in employment chances, earnings, work-life satisfaction, and long-term mobility make up for these minor initial drawbacks. Employer gains from reduced turnover, higher productivity, and lower injury rates often surpass the costs of paying higher wages post-training and operating the apprenticeship program. Because the majority of apprenticeship programs are privately funded, the public also benefits from better quality work, increases in tax revenue, and lower social insurance taxes at little to no social cost (Samek Lodovici et al., 2013).

In the United States, the most influential and comprehensive research on registered apprentices was conducted by analysts at Mathematica Policy Research for the U.S. Department of Labor Employment and Training Administration (Reed et al., 2012). The study performed a cost-benefit analysis of registered apprenticeship programs in 10 states that differed across labor market characteristics, including usage of apprenticeship programs, region, and level of unionization. The analysis found that participants in registered apprenticeship programs have substantially higher earnings than nonparticipants. On average, apprenticeship participants earn $123,906 more in wages and fringe benefits over their careers. In addition, apprenticeship training reduces a construction worker's chances of suffering a spell of long-term unemployment, saving government entities thousands of dollars per apprentice.

Female apprentices in the United States express positive views on registered apprenticeship programs as pathways to career advancement (Reed et al., 2012). However, women only comprise 6 percent of all active apprentices in the United States (Olinsky & Ayers, 2013). To increase the number of women in apprenticeship programs, female apprentices say that there needs to be more targeted outreach and information, more assistance with child care, and more efforts to combat harassment (Reed et al., 2012). In addition, research has shown that joint labor-management programs with a partnership between employers and unions have higher enrollments of women and people of color. Attrition rates of women and people of color are also lower in joint programs (Glover & Bilginsoy, 2005).

Apprenticeship training is particularly important to the construction industry in America. University of Utah economist Peter Philips is the nation's foremost expert on the construction labor market in America. Philips has published multiple studies detailing the importance of apprenticeship training programs in states across the nation (Philips, 2015a; Philips, 2015b; Philips, 2014). Apprenticeship training in the construction industry, he argues, definitively makes construction workers safer and more productive, and creates stable middle-class jobs in an otherwise turbulent labor market (Philips, 2015a). Each new building, industrial facility, road, dam, or sewage system "is in many ways a unique, one-of-a-kind, distinctive project" that construction workers need to know how to evaluate and construct. In addition, construction is the

most dangerous major industry in the United States. Investment in training and skill upgrading translates into fewer workplace injuries and fewer job interruptions (Philips, 2015a).

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 funded by labor unions and signatory employers. For example, fully 95 percent of all construction training in Wisconsin is provided by union contractors (Philips, 2015a). Similarly, joint labor-management programs in Indiana account for 94 percent of all apprenticeship training expenditures (Philips, 2015b). While representatives of nonunion construction firms have advocated for a guest worker program to hire cheap foreign labor during skills shortage, joint labor-management programs instead invest in local workers to stabilize the supply of skilled labor (Philips, 2015a).

While partnerships between employers and unions help to institutionalize effective training programs in a seasonal, job-to-job, and cyclical industry, prevailing wage laws also promote long-term apprenticeship training in construction. A prevailing wage law specifies wage, benefits, and training standards for public construction projects. In essence, prevailing wage is a minimum wage for construction workers employed on projects funded using taxpayer dollars, intended to protect local construction standards and apprenticeship programs by leveling the playing field for contractors (Manzo et al., 2016).

Economic research has repeatedly found that the prevailing wage laws support registered apprenticeship programs in construction. After Colorado and Kansas repealed their prevailing wage laws in the mid-1980s, apprenticeship training fell by 42 percent and 38 percent, respectively (Philips, 1998). In 2012, states that had prevailing wage laws had 65 percent more enrolled apprentices and 60 percent more graduating apprentices per hour of construction work compared to states without prevailing wage laws. As a result, construction workers are between 21 percent and 33 percent more productive in states that have prevailing wage standards (Philips, 2014).

Data and Methodology

This Research Report utilizes data from three primary sources. First, the Project for Middle Class Renewal at the University of Illinois at Urbana-Champaign and the Illinois Economic Policy Institute issued a Freedom of Information Act Request (FOIA) to the U.S. Department of Labor. In early 2016, complete Fiscal Year (FY) 2015 data were obtained on 12,123 active apprentices in Illinois. The dataset includes the name, physical address, identification number, and sponsorship type of each registered apprenticeship program. In addition, the information provided also contains the reported number of active apprentices in each program, including active female apprentices and people of color participating in each program.

Second, using this FOIA information, each registered apprenticeship program was cross-referenced with Form 990 reports submitted to the Internal Revenue Service (IRS) by tax-exempt organizations, nonexempt charitable trusts, and section 527 political organizations. Form 990s are publicly available and can be found on multiple online databases (e.g., ProPublica, 2016). Complete Form 990 data was available for registered apprenticeship programs that enrolled 9,346 active participants out of 10,811 construction apprentices (86.5 percent). Among other items, Form 990 reports include information on annual program revenues, functional expenses, net assets and liabilities, occupancy and land expenditures, and the number of workers employed by the apprenticeship program as well as their wages and salaries.

The data gathered from the FOIA and Form 990 reports were inputted into an economic impact analysis using IMPLAN (IMpact analysis for PLANning). IMPLAN is an input-output software that estimates the multiplier, or ripple effect, of changes in industry spending or household expenditures based on Census data (IMPLAN, 2016). The IMPLAN model provides estimates on the impact of apprenticeship program spending on economic activity, employment, and tax revenues in Illinois every year.

The third primary data source used in this study is the 2014 *American Community Survey* (5-year estimates) in which the U.S. Census Bureau annually interviews one percent of the U.S. population (Ruggles et al., 2015). Data include observations of 630,344 total Illinois residents over five recent years. This information is primarily analyzed to estimate the personal benefit of having specific bachelor's degrees in Illinois, as well as other levels of educational attainment. To compare the personal effect of participating in a registered apprenticeship program to the personal effect of various educational degrees, a standard ("ordinary least squares") regression analysis is performed which controls for an array of other important economic factors, such as demographics, employment variables, and county of residence in Illinois.

Finally, the report also makes use of apprenticeship data and statistics published by the U.S. Department of Labor Employment and Training Administration (DOLETA, 2016a) and the 2012 *Economic Census of Construction* (Census Bureau, 2015).

Projected Construction Employment Growth in Illinois

Construction is the fastest-growing industry in Illinois (Figure 1). Over the next decade, the construction industry is expected to expand by 12.4 percent in Illinois, adding over 25,000 new jobs. The professional and business services industry is projected to be the 2nd-fastest growing sector of the Illinois economy (10.9 percent), followed by leisure and hospitality (10.6 percent), educational and health services (7.5 percent), and trade, transportation, and utilities (6.1 percent). In addition, total employment in Illinois is expected to grow by 5.9 percent over the next decade. The construction industry is thus expected to grow at twice the pace of the state economy.

FIGURE 1: PROJECTED EMPLOYMENT GROWTH IN ILLINOIS BY INDUSTRY, 2014-2024

Rank	Industry	New Jobs: 2014-2024	Growth Rate: 2014-2024
IL	*Total, All Industries*	*371,593*	*5.93%*
1	**Construction**	**25,049**	**12.42%**
2	Professional and Business Services	100,120	10.94%
3	Leisure and Hospitality	58,838	10.55%
4	Educational and Health Services	99,404	7.47%
5	Trade, Transportation, and Utilities	73,637	6.10%
6	Financial Activities	18,963	5.13%
7	Other Services	14,347	4.99%
8	Information	701	0.71%
9	Self-Employed Workers	1,058	0.37%
10	Government	-116	-0.03%
11	Manufacturing	-16,746	-2.89%
12	Agricultural Production	-3,210	-4.38%
13	Natural Resources and Mining	-452	-4.60%

Source(s): IDES (2016) – "Employment Projections: Long-Term Industry Projections (2014-2024)."

There are multiple trades within the construction industry. Most of these construction *occupations* are also expected to grow faster than the 5.9 percent growth in the state's labor market. Figure 2 presents the ten fastest-growing trades by anticipated number of new jobs over the next decade. The construction occupations that will add the most jobs over the next decade will all require well-trained, skilled workers. Apprenticeship programs are the principal institutions providing future construction workers with the skills they need to fill these jobs.

Each of the fastest-growing trades in Illinois typically requires at least 3 years of apprenticeship training (Figure 2). The Illinois economy is expected to add over 4,300 construction laborer jobs by 2024. Workers filling construction laborer positions typically need to have completed a 3-year apprenticeship program in Illinois. Electrician occupations and plumber-pipefitter-steamfitter careers will respectively add over 3,600 and 2,100 jobs, and both require a 4- or 5-year apprenticeship. First-line supervisors of construction workers, which generally necessitate a bachelor's degree, will also add over 1,000 jobs.

Contractors in Illinois and across the nation also report a high demand for construction workers (AGC, 2015). In a 2015 survey by the Associated General Contractors of America, about 9-in-10 construction companies reported that they expected to hire additional or replacement craft workers in the next 12 months in both Illinois (93 percent) and the broader United States (89 percent). Fully 64 percent of contractors in Illinois report difficulty in finding workers to fill these construction occupations and 36 percent expect it to become more difficult. The share of construction firms that have trouble filling craft positions is even higher nationwide, at 86 percent, but only 25 percent believe it will become harder to find workers over the next 12 months (Figure 3).

FIGURE 2: PROJECTED JOB GROWTH IN ILLINOIS CONSTRUCTION OCCUPATIONS, TOP 10 TRADES, 2014-2024

Rank	Occupation	New Jobs: 2014-2024	Growth Rate: 2014-2024	Typical Training Required
1	Construction Laborers	4,304	9.76%	3 years apprenticeship
2	Electricians	3,668	15.02%	4-5 years apprenticeship
3	Plumbers, Pipefitters, & Steamfitters	2,105	12.30%	4-5 years apprenticeship
4	Carpenters	1,560	4.93%	3-4 years apprenticeship
5	First-Line Supervisors and Managers	1,071	8.56%	Bachelor's degree
6	Roofers	727	13.81%	3 years apprenticeship
7	Brickmasons & Blockmasons	726	18.25%	3-4 years apprenticeship
8	Operating Engineers	687	5.94%	3-4 years apprenticeship
9	Painters	670	5.94%	3-4 years apprenticeship
10	Cement Masons & Finishers	620	11.67%	3 years apprenticeship

Source(s): IDES (2016) – "Employment Projections: Long-Term Occupational Projections (2014-2024)."

One of the main reasons why fewer Illinois contractors experience difficulty in filling craft positions is the high degree of unionization in Illinois' construction labor market (Figure 3). Fully 92 percent of contractors in Illinois report that they employ union workers on most or all of their projects, compared to 30 percent nationwide. The strong partnership with construction labor unions helps construction employers in Illinois institutionalize training through joint apprenticeship programs, and provides contractors with a stable supply of skilled workers.

FIGURE 3: WORKFORCE SURVEY RESULTS OF MEMBERS OF THE ASSOCIATED GENERAL CONTRACTORS, 2015

Question	Illinois	United States
Expect firm to hire additional or replacement craft workers in the next 12 months	93%	89%
Have trouble filling hourly craft positions	64%	86%
Expect it to become harder to hire craft workers over the next 12 months	36%	25%
Firm employs union workers on most or all of its projects	92%	30%

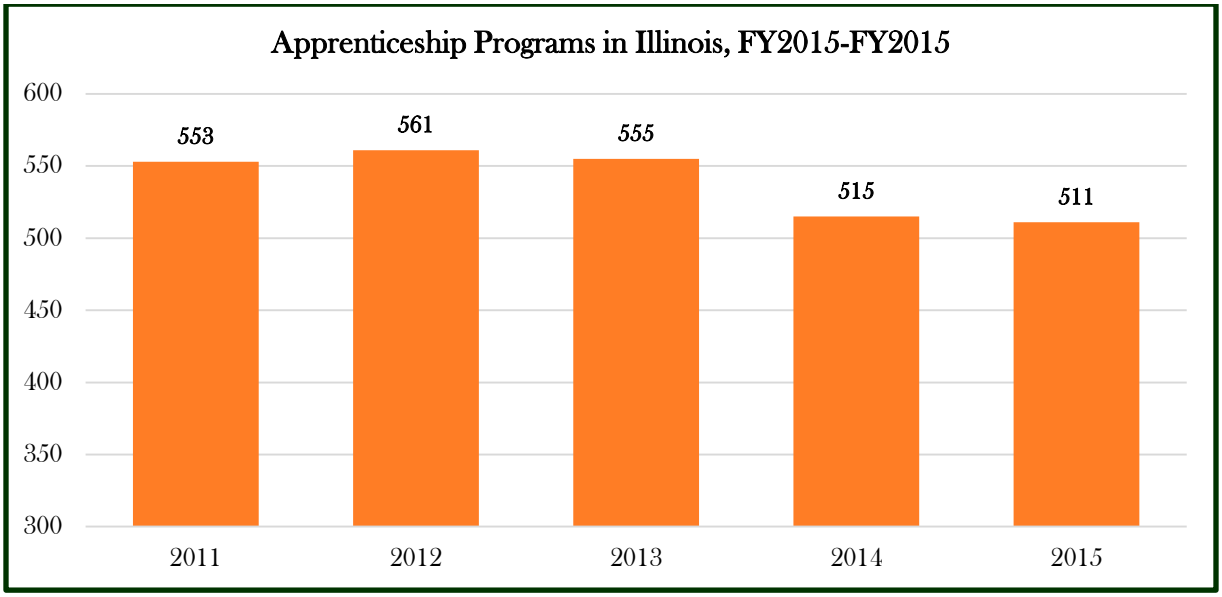
Source(s): AGC (2015) – "Materials: National Survey Results" and "State-Specific Results and Analysis: Illinois."

THE IMPACT OF APPRENTICESHIP PROGRAMS IN ILLINOIS

Overview of Registered Apprenticeship Programs

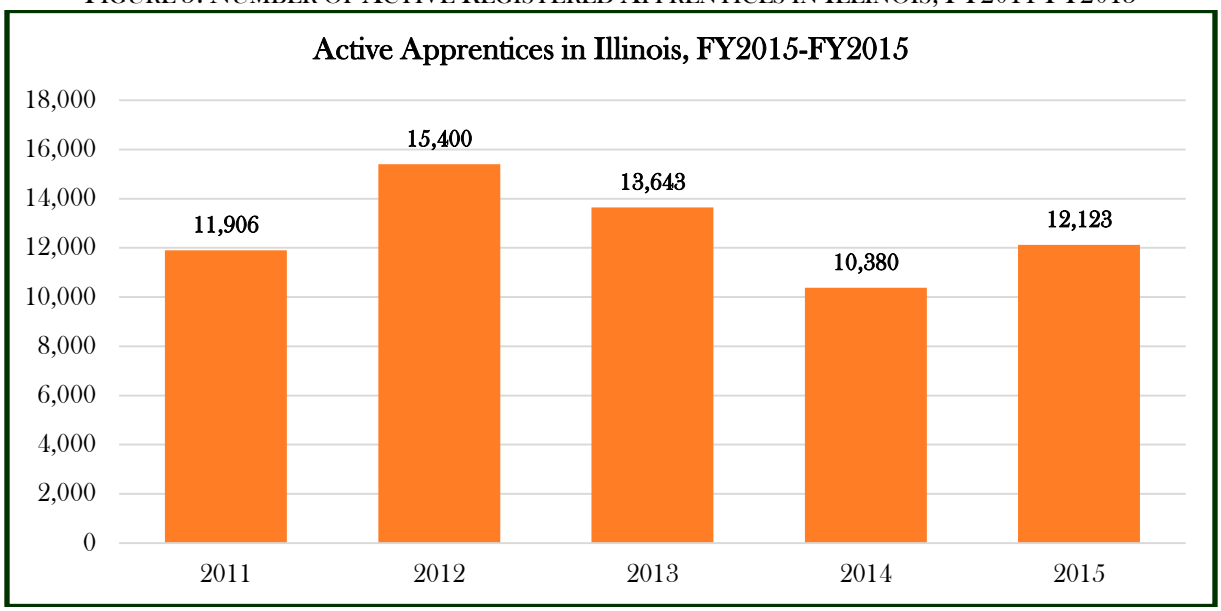
According to data from the U.S. Department of Labor Employment and Training Administration, the number of registered apprenticeship programs is decreasing in Illinois (DOLETA, 2016a). Between FY2011 and FY2013, the number of programs exceeded 550 in the state (Figure 4). In FY2014, however, programs dropped to 515. Last year, the number of apprenticeship programs fell to 511, a decline of 50 programs from the recent peak in FY2012. Despite rising demand for construction workers and other potentially apprenticeable occupations, many programs have closed across the state.

FIGURE 4: NUMBER OF REGISTERED APPRENTICESHIP PROGRAMS IN ILLINOIS, FY2011-FY2015



Source(s): DOLETA (2016a) – "Data and Statistics: FY 2015, FY 2014, FY 2013, FY 2012, FY 2011."

FIGURE 5: NUMBER OF ACTIVE REGISTERED APPRENTICES IN ILLINOIS, FY2011-FY2015



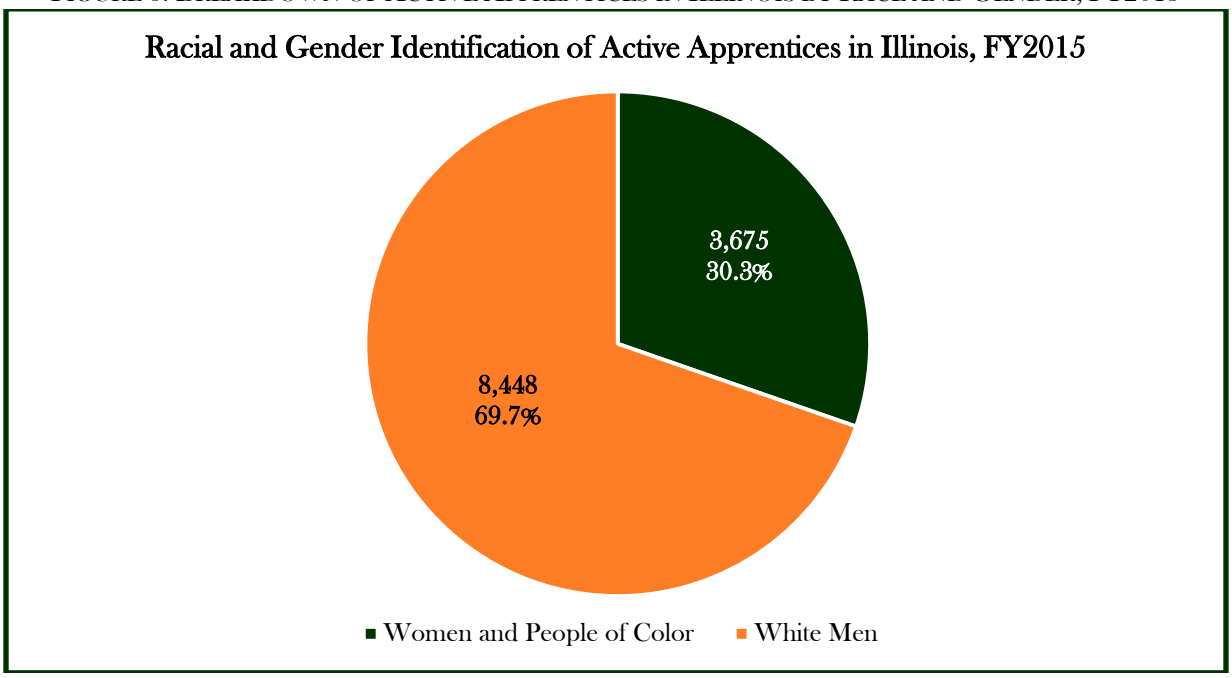
Source(s): DOLETA (2016a) – "Data and Statistics: FY 2015, FY 2014, FY 2013, FY 2012, FY 2011."

The number of active registered apprentices in Illinois totaled 12,123 in FY2015 (Figure 5). This was an increase of 1,743 apprentices over the previous year, but was significantly less than the FY2012 peak of 15,400 apprentices (-3,277 individuals). On average, apprenticeship programs in Illinois have trained 12,690.4 apprentices per year since 2011.

The program-level data obtained from the U.S. Department of Labor FOIA reports that there were 12,123 active apprentices in Illinois in FY2015. This is equivalent to the summary DOLETA data. However, the FOIA request provides additional information on active apprentices by gender and racial identification, occupation type, and program type.

The bulk of active registered apprentices in Illinois are Caucasian white men (Figure 6). According to state data, a reported 8,448 registered apprentices were white men in FY2015, which is approximately 7 out of every 10 apprentices. Conversely, a total of 3,675 women and people of color were active participants in Illinois' registered apprenticeship programs last year (30.3 percent).

FIGURE 6: BREAKDOWN OF ACTIVE APPRENTICES IN ILLINOIS BY RACE AND GENDER, FY2015



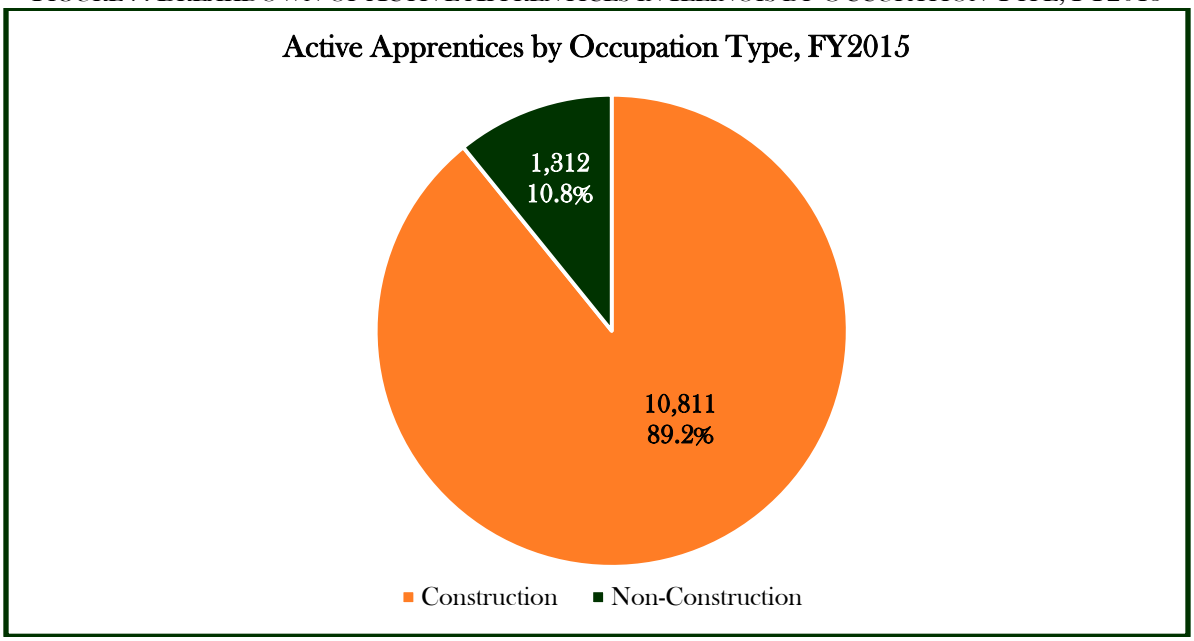
Source(s): Authors' analysis of DOL (2016) – Freedom of Information Act (FOIA) Request.

Apprenticeship programs in Illinois are predominantly intended for construction careers (Figure 7). An analysis of the DOL data reveals that 10,811 active apprentices in Illinois participate in a construction-based program, or 89.2 percent of all apprentices. Most of the non-construction apprenticeships are geared towards manufacturing and tool works, but there are fire departments, private security forces, and energy and utilities companies with registered apprenticeship programs in Illinois. Nearly all of the apprenticeship programs in Illinois are in industries that, historically, have had male-dominated workforces.

Programs funded jointly by employers and labor unions account for the vast majority of human capital investment in Illinois' construction industry (Figure 8). An evaluation of the 10,811 registered apprentices on construction career paths finds that 10,646 apprentices were enrolled in joint labor-management programs, or 98.5 percent. Only 165 active construction apprentices (1.5 percent) participated in non-joint, nonunion programs. In addition, a total of 3,277 apprentices participating in joint-labor management programs were women and people of color, a female and minority share of 30.8 percent. By contrast, non-

joint programs report 46 women and individuals of color enrolled in their programs, a 27.9 percent share. Thus, to the extent that women and people of color are underrepresented in construction apprenticeship programs, the concern is an industry-wide problem.

FIGURE 7: BREAKDOWN OF ACTIVE APPRENTICES IN ILLINOIS BY OCCUPATION TYPE, FY2015



Source(s): Authors' analysis of DOL (2016) – Freedom of Information Act (FOIA) Request.

FIGURE 8: BREAKDOWN OF ACTIVE APPRENTICES IN ILLINOIS BY SPONSORSHIP TYPE, FY2015

Sponsorship Type	Active Apprentices	Women and People of Color	Share of Women and People of Color
Joint Labor-Management Programs	10,646	3,277	30.78%
Non-Joint Programs	165	46	27.88%
Share by Joint Labor-Management Programs	*98.47%*	*98.62%*	--

Source(s): Authors' analysis of DOL (2016) – Freedom of Information Act (FOIA) Request.

Complete Form 990 data made publicly available by the Internal Revenue Service (IRS) were obtained for registered apprenticeship programs that enrolled 9,346 active participants in Illinois' construction industry (86.5 percent) (Figure 9). Data for programs covering the remaining 1,465 construction apprentices (13.5 percent) were either unavailable or difficult to find. This research assumes that programs with missing data have similar characteristics as those with complete data. For example, missing programs are assumed to have the same average expenditures per apprentice as programs with available data. The analysis "imputes" this missing data to provide estimates for the entire state.

FIGURE 9: FORM 990 AVAILABILITY FOR CONSTRUCTION APPRENTICESHIP PROGRAMS IN ILLINOIS, FY2015

Availability of Form 990 Financial Documents	Apprentices Covered
Programs with Complete Form 990 Data	9,346
Programs with Missing Data	1,465
Share of Construction Apprentices Covered in the Data	*86.45%*

Source(s): Authors' analysis of IRS Form 990 using data from DOL (2016) – Freedom of Information Act (FOIA) Request.

Figure 10 presents the ten largest construction apprenticeship programs with available data in Illinois by annual expenditures. The joint program between the United Association (UA) Local 597 and plumbing and pipefitting contractors ranks as the largest program in the state, with $20.7 million in total functional expenditures. The International Union of Operating Engineers Local 150 and signatory contractors operate the 2nd-largest program, with nearly $15.7 million in functional expenses. The Chicago Regional Council of Carpenters and associated employers follow with $12.6 million in training expenses, but their joint-labor management program includes 1,395 active registered apprentices– more than any other program in the state. The key takeaway from Figure 10 is that all ten of the largest apprenticeship programs are joint programs funded through private investments by employers and unions. The largest nonunion program, operated by the Illinois Chapter of the Associated Builders and Contractors (ABC) reported just $24,138 in functional expenses ($194,041 in total revenue) and 36 active apprentices in its most-recent Form 990 filing.

FIGURE 10: TEN LARGEST CONSTRUCTION APPRENTICESHIP PROGRAMS BY FUNCTIONAL EXPENSES, FY2015

Rank	Construction Program	Joint or Non-Joint	Physical Location	Total Functional Expenses	Active Apprentices
1	United Association (UA) 597	Joint	Mokena	$20,724,438	838
2	Operating Engineers 150	Joint	Wilmington	$15,675,345	373
3	Chicago Regional Council of Carpenters	Joint	Elk Grove Village	$12,562,492	1,395
4	IBEW NECA Technical Institute	Joint	Alsip	$8,963,195	933
5	Chicagoland Laborers	Joint	Carol Stream	$8,703,109	307
6	Illinois Laborers' and Contractors	Joint	Mount Sterling	$6,084,477	499
7	United Association (UA) 130	Joint	Chicago	$3,413,557	406
8	Operating Engineers 649	Joint	Bartonville	$2,262,472	55
9	Chicago Area Painting	Joint	Berkeley	$1,798,987	186
10	Sheet Metal Workers 73	Joint	Bellwood	$1,606,554	112

Source(s): Authors' analysis of IRS Form 990 using data from DOL (2016) – Freedom of Information Act (FOIA) Request.

Apprenticeship training for construction workers is dominated by joint labor-management programs in Illinois. An analysis of Form 990s submitted by registered apprenticeship programs affiliated with construction finds that the programs receive an estimated $156.0 million in annual revenues and spend about $135.4 million to train construction workers (Figure 11). Joint labor-management programs generate 99.5 percent of all private training contributions in Illinois, bringing in $155.1 million compared to about $850,000 for non-joint programs. In addition, joint labor-management apprenticeship programs comprise 99.2 percent of all privately-funded apprenticeship expenditures in Illinois. Programs involving an employer-union partnership spent an estimated $135.4 million on construction worker apprenticeship training while nonunion programs have about $1.1 million in functional expenditures.

FIGURE 11: CONSTRUCTION APPRENTICESHIP PROGRAM OPERATIONS AND ASSETS IN ILLINOIS, FY2015

Sponsorship Type	Total Active Apprentices	Total Estimated Revenues	Total Estimated Expenditures	Reported Land, Building, and Equipment Assets
Joint Labor-Management Programs	10,646	$155,110,899	$135,359,376	$263,000,450
Non-Joint Programs	165	$850,346	$1,086,683	$1,012
Total from All Programs	10,811	$155,961,246	$136,446,058	$263,001,462
Share by Joint Labor-Management Programs	*98.47%*	*99.45%*	*99.20%*	*100.00%*

Source(s): Authors' analysis of IRS Form 990 using data from DOL (2016) – Freedom of Information Act (FOIA) Request.

Joint programs are also positioned for future success (Figure 11). In the aggregate, joint-labor management programs ran a surplus ($19.8 million) in FY2015 while non-joint programs operated at a deficit last year

(-$236,336). Joint programs in construction also report a combined $263.0 million in land, building, and equipment assets compared to about $1,000 for non-joint programs.

Joint labor-management training programs in construction differ from their nonunion counterparts in many significant ways (Figure 12). On average, joint labor-management programs generate $14,570 in revenue per apprentice, over 2.8 times as much as non-joint programs ($5,154 per apprentice). As a result, functional expenditures equate to $12,715 per registered construction apprentice in Illinois' joint labor-management programs compared to $6,586 in spending per nonunion apprentice.

Because joint labor-management programs spend 1.9 times as much per participant to provide skills training to workers, the number of apprentices per program employee is lower in joint programs (Figure 12). There are 3.7 registered apprentices for every one program employee in joint labor-management training programs in construction on average. By contrast, non-joint programs have 14.7 registered apprentices per training employee.

The typical large joint apprenticeship school has multiple full- and part-time employees. Many of these employees have significant experience working and teaching in the relevant trade. For example, the Operating Engineers Local 150 joint program has 24 full-time instructors with an average of nearly 25 years of experience as a working operator (Turek, 2016). Electrical Workers Local 134 and the National Electrical Contractors Association apprenticeship school utilizes 20 full-time instructors (NEAP, 2006). Chicagoland Laborers' District Council Training program has at least 21 teachers and the United Association of Pipefitters Local 597 employs 17 regular instructors (*Herald-Whig*, 2012; Chicago Pipefitters Local 597). Additionally, the Chicago Regional Council of Carpenters program has 20 full-time and 25 part-time instructors (Spicca, 2016). These instructors have worked a minimum of 20 years in the trade and completed three years of teaching training at Penn State University.

The aforementioned schools are large training programs, but smaller joint programs also provide extensive instructional services. For instance, the Laborers Local 703 joint training program in Urbana has 13 instructors for 74 apprentices. By comparison, the non-joint programs have a total of only 11 reported employees. Similar to the economic research on class sizes in schools, a lower apprentice-to-program employee ratio means that active apprentices in joint programs likely receive more attention in classroom instruction and more support while performing on-the-job training.

FIGURE 12: CONSTRUCTION APPRENTICESHIP PROGRAM OPERATIONAL METRICS IN ILLINOIS, FY2015

Operational Metric	Joint Labor-Management Programs	Non-Joint Programs	Difference
Revenues Per Apprentice	$14,569.88	$5,153.61	2.83x
Expenditures Per Apprentice	$12,714.58	$6,585.95	1.93x
Total Employees	2,860	11	+2,849
Apprentices Per Program Employee	3.72	14.67	-10.95
Average Employee Compensation	$26,386	$3,914	+$22,472

Source(s): Authors' analysis of IRS Form 990 using data from DOL (2016) – Freedom of Information Act (FOIA) Request.

To further assess the magnitude of construction apprenticeship programs in Illinois, reference information from the most-recent *Economic Census of Construction* are utilized (Census Bureau, 2015). The *Economic Census of Construction* is a national survey of construction contractors that is conducted every five years by the U.S. Census Bureau and the Bureau of Economic Analysis at the U.S. Department of Commerce.

Figure 13 provides three economic indicators to assess the annual investment made by the state's construction industry to upgrade worker skills. According to the most-recent *Economic Census of Construction*, there were 25,046 construction establishments (or workplaces) employing blue-collar construction workers in Illinois. Dividing total estimated apprenticeship program revenues by this indicator reveals that the construction industry contributes over $6,000 per establishment for skills development. Given the high degree of coordination between employers and unions in the state's construction industry, this market outcome has primarily been the result of private negotiations.

Contractors have agreed to this investment in order to have access to a stable supply of well-trained productive craft workers, while employees have agreed to contribute a portion of their wages to ensure their fellow coworkers are safe and skilled. In fact, the average blue-collar construction worker contributes an estimated $0.56 per hour worked to apprenticeship training in Illinois. While certain trades earn higher hourly incomes than others because they require more skill and involve greater risk, the average blue-collar construction worker in Illinois earns approximately $37.51 per hour in base wages plus fringe benefits. Thus, the $0.56-per-hour investment in the skills training of the future workforce also represents a 1.5 percent contribution from the earnings of the average construction worker (Figure 13).

FIGURE 13: APPRENTICESHIP REVENUES VS. CONSTRUCTION MARKET INDICATORS IN ILLINOIS, FY2015

Economic Indicator	2012 *Economic Census* Data	FY2015 Apprenticeship Revenues Per 2012 Indicator
Construction Establishments	25,046	$6,227
Hours Worked by Blue-Collar Construction Workers	279,064,000	$0.56
Average Blue-Collar Wage Plus Benefits	$37.51	1.49%

Source(s): Authors' analysis of Census Bureau (2015) – 2012 Economic Census of Construction *using IRS Form 990 data.*

The Annual Economic Impact of Apprenticeship Programs in Construction

While the previous section analyzed, compared, and contrasted program revenues and functional expenditures, this section evaluates the broader impact of the programs on the entire Illinois economy. On average, construction apprenticeship programs increase the annual earnings of program participants. Data from the 2014 *American Community Survey* from the U.S. Census Bureau reveals that the average construction worker between the ages of 18 and 24 earns approximately $21,135 more in annual wages per year than comparable workers with the same demographics (Ruggles et al., 2015). These earnings increase consumer spending in the Illinois economy, which in turn saves or creates jobs. In addition, the functional expenditures of apprenticeship programs employ instructors and administrative staffers, pay for modern equipment, and cover building and land costs.

This section utilizes IMPLAN (IMpact analysis for PLANning) to measure the impact of construction apprenticeship program spending on economic activity, employment, and tax revenues in Illinois every year. Considered the "gold standard" for economic impact modeling, IMPLAN is an input-output software that estimates the multiplier, or ripple effect, of changes in industry spending or household expenditures (Vowels, 2012). The input-output model investigates economic relationships based on Census data, specifically measuring market transactions between sectors and consumers. In essence, IMPLAN follows each dollar flowing through the Illinois economy, and uses recent data and trends to estimate the impact of future policy changes or economic events. Two "events" are inputted into the analysis– the $136.4

million in estimated functional expenditures by the registered apprenticeship programs in construction and $228.4 million in estimated net earnings by construction apprentices over one year.[1]

Registered apprenticeship programs in Illinois' construction industry generate substantial economic benefits to the state every year (Figure 14). The economic impact analysis estimates that the direct impact of registered apprenticeship programs in Illinois is the creation of 2,675 jobs.[2] Through program expenditures, registered apprenticeship programs indirectly save or create another 929 jobs in the Illinois economy. Finally, the net on-the-job earnings of apprentices, program staff and instructors, and workers indirectly employed by program expenditures all raise consumer demand in the local economy, adding another 1,355 jobs. The cumulative impact of registered apprenticeships, their positive effect on local industries, and the additional consumer demand stimulated by workers is a gain of nearly 5,000 total jobs in Illinois and a $408.7-million boost to the state economy every year. Compared to annual functional expenditures, the economic return on investment is a $3.00 increase in Illinois GDP per dollar spent on construction worker training over one year.

FIGURE 14: THE ECONOMIC IMPACTS OF CONSTRUCTION APPRENTICESHIP PROGRAMS IN ILLINOIS, 2016

Economic Effect (IMPLAN Estimates)	Employment (Jobs Created or Saved)	Illinois GDP (Value Added to the Economy)
Direct Effect of Apprentices	2,675	$184,235,554
Indirect Effect on Local Industries	929	$105,027,377
Net Consumer Demand Effect	1,355	$119,410,422
Total Effects of Registered Apprenticeships	4,959	$408,673,353

Source(s): Authors' analysis of IMPLAN (2016); Form 990 data using DOL (2016) FOIA; Ruggles et al. – 2010-2014 American Community Survey *(2015). The analysis assumes a local purchasing power of 93.14%, which is the value of construction work in Illinois completed by in-state contractors according to the 2012* Economic Census of Construction *in Census Bureau (2015).*

FIGURE 15: THE TAX IMPACTS OF CONSTRUCTION APPRENTICESHIP PROGRAMS IN ILLINOIS, 2016

Net Tax Effects (IMPLAN Estimates)	State and Local Tax Revenue Gain
Personal Income Taxes	$6,539,762
Household Sales Taxes	$7,227,344
Total Property Taxes	$9,505,460
Corporate Taxes	$1,808,189
All Other Taxes, Licenses, and Fees	$3,532,374
Total Tax Effects	$28,613,129

Source(s): Authors' analysis of IMPLAN (2016); Form 990 data using DOL (2016) FOIA; Ruggles et al. – 2010-2014 American Community Survey *(2015). The analysis assumes a local purchasing power of 93.14%, which is the value of construction work in Illinois completed by in-state contractors according to the 2012* Economic Census of Construction *in Census Bureau (2015).*

The positive employment and value-added impacts of registered apprenticeship programs in construction also result in stronger state and local budgets (Figure 15). Because registered apprenticeship programs increase worker income and improve consumer demand, the programs annually generate $6.5 million in personal income tax revenue and an additional $7.3 million in sales tax revenue. Property tax revenues, which include assessments on homes purchased by apprentices and facilities and land owned by the apprenticeship programs, are $9.5 million higher every year due to the construction training programs.

[1] This estimate is the multiplication of 10,811 active construction apprentices by $21,135 in average net earnings per young construction worker.

[2] As reported in Figure 12, apprenticeship programs actually provide 2,871 jobs for instructors and other employees in Illinois, so the economic model is accurate.

Positive impacts on local businesses also produce $1.8 million in net corporate tax revenue. Other taxes, licenses, and fees increase state and local government revenue by $3.5 million. In total, registered apprenticeship programs increase state and local tax revenues by an estimated $28.6 million every year.

The Long-Run Economic Impact of Apprenticeship Programs in Construction

Registered apprenticeship programs have even larger impacts over an entire working career. Mathematica Policy Research reports that the average registered apprentice conservatively earns $123,906 more in earnings and fringe benefits over the course of his or her career due to his or her participation in a program (Reed et al., 2012). In addition, apprenticeship training reduces a construction worker's chances of suffering long-term unemployment spells. As a result, government assistance spending, on average, is lower for skilled construction workers. Each registered apprentice saves government entities an estimated $2,694 in unemployment insurance compensation, $1,760 in food stamp value, and $549 in welfare costs over 36 years (Reed et al., 2012).

The aggregate impact of registered apprenticeship programs in Illinois' construction industry is a $1.25 billion increase in economic output to the state (Figure 16). Over the careers of program participants, the federal government receives $101.4 million in additional tax revenues, and state and local government tax revenue increases by $98.7 million in Illinois. The programs also result in significant taxpayer savings, including a $27.1 million reduction in unemployment insurance compensation, a $17.7 million drop in food stamp spending, and a $5.5 million decrease in welfare costs over the long run.

FIGURE 16: THE LONG-RUN IMPACTS OF CONSTRUCTION APPRENTICESHIP PROGRAMS IN ILLINOIS

Impact	Long-Run Economic Benefit
Illinois Gross Domestic Product (GDP)	$1,247,655,000
State, Federal, and Local Government	$250,506,000
State and Local Tax Revenues	$98,740,000
Federal Tax Revenues	$101,388,000
Unemployment Insurance Compensation Savings	$27,127,000
Food Stamp Value Savings	$17,722,000
Welfare Cost Savings	$5,528,000
Annual GDP Return Per Private Dollar Invested	$3.00
Long-Run GDP Return Per Private Dollar Invested	$9.14
Long-Run GDP and Government Revenue Return on Investment	$10.98

Source(s): Authors' application of long-run estimate in Reed et al. (2012); Form 990 data using DOL (2016) FOIA. The analysis assumes a local purchasing power of 93.14%, which is the value of construction work in Illinois completed by in-state contractors according to the 2012 Economic Census of Construction *in Census Bureau (2015).*

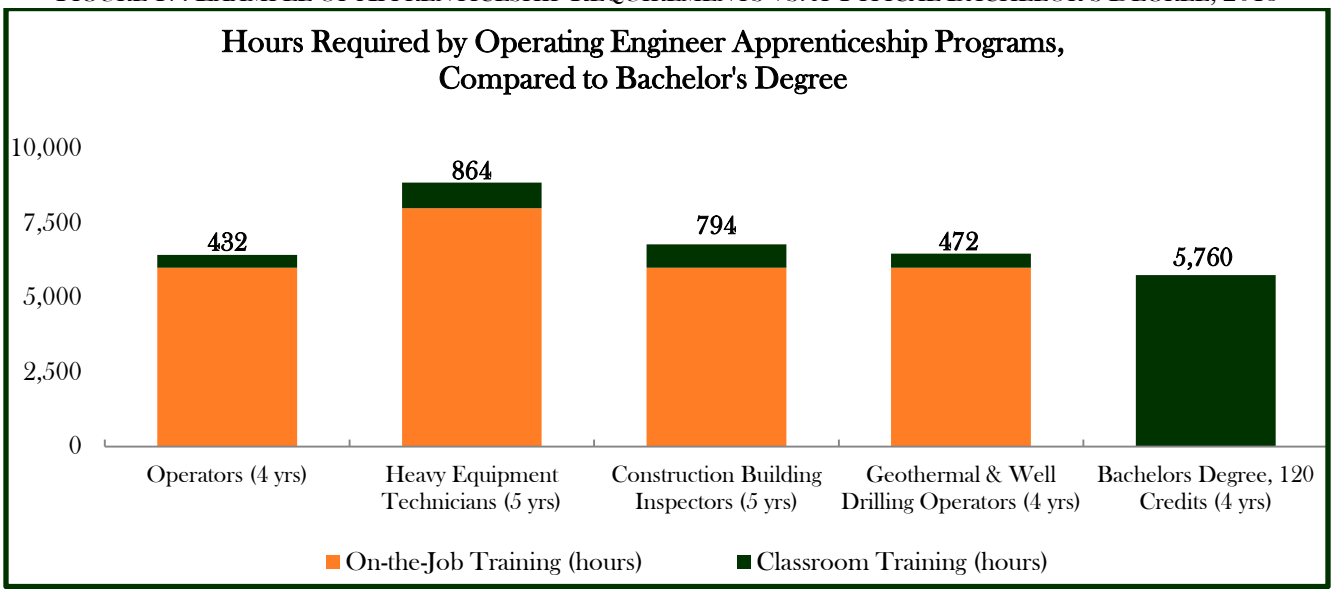
The economic return on investment from construction apprenticeship programs is substantial (Figure 16). While each cohort of apprentices returns $3.00 per private training dollar invested over one year, the long-run impact is much higher. The economic return on investment from these construction programs is $9.14 per dollar spent on worker training 36 years. That is, every dollar contributed by a construction worker or contractor to skills development generates $9.14 in long-run economic production for the Illinois economy. However, the return on investment is even greater if government revenue and savings are included. For every dollar invested in apprenticeship training, $10.98 is returned to Illinois in total economic and social benefits.

These employment, economic, and tax revenue impacts are directly attributable to privately-funded apprenticeship programs in Illinois' construction industry. Given the fact that joint labor-management programs account for nearly all of the investment in construction worker training, any claim that labor unions have a negative impact on the economy *must* consider these positive economic and social benefits. Assuming joint labor-management programs directly account for 98.5 percent of total benefits (i.e., equal to the share of active apprentices in joint programs), construction unions are responsible for 4,885 annual jobs, $1.23 billion in economic output, and $97.3 million in state and local tax revenues in Illinois through their registered apprenticeship programs.

Construction Apprenticeships Compared to University-Level Education in Illinois

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. The apprenticeship program sponsored jointly by the International Union of Operating Engineers Local 150 and signatory contractors, for example, requires at least 6,432 total hours of training over at least four years, including a minimum of 6,000 hours of on-the-job training (Figure 17). Heavy equipment technicians complete an even longer program: apprentices must log 8,000 hours of on-the-job training and 864 hours in the classroom over five years in order to complete the program. By contrast, the typical 120-credit hour bachelor's degree at the University of Illinois at Urbana-Champaign requires 5,760 hours of classroom time over four years and generally does not require any development of hard skills through on-the-job training.

FIGURE 17: EXAMPLE OF APPRENTICESHIP REQUIREMENTS VS. A TYPICAL BACHELOR'S DEGREE, 2015



Source(s): Turek (2016) – International Union of Operating Engineers (IUOE) Local 150 requirements; LAS (2015) – "Minimum Requirements for a Degree."

The comparison to university-level education is revealing. Through registered apprenticeship programs, the construction industry "operates the largest privately-financed system of higher education in the country" (Philips, 2014). In fact, if all registered apprenticeship programs for construction occupations in Illinois were combined, they would be one of the largest post-secondary educational institutions in the state (Figure 18). There were 10,811 participants in construction registered apprenticeship programs in Illinois in FY2015. This would fall between total student enrollment at Northeastern Illinois University (11,193 students), a public school, and total student enrollment at Roosevelt University (7,708 students), a private

institution. Construction apprenticeship programs would rank behind the 12,464-student Columbia College Chicago as the 7th-largest private university in Illinois.

FIGURE 18: REGISTERED APPRENTICES VS. TOP 20 LARGEST UNIVERSITIES IN ILLINOIS, WITH COST, 2015

Rank	Construction Registered Apprenticeships vs. Universities in Illinois	Total Enrollment	In-State Tuition Cost	Private Rank
1	University of Illinois at Urbana-Champaign	42,858	$24,580	-
2	University of Illinois at Chicago	25,709	$26,168	-
3	Northern Illinois University	24,397	$21,372	-
4	DePaul University	22,554	$39,130	1
5	Illinois State University	20,799	$21,427	-
6	Southern Illinois University Carbondale	20,675	$20,371	-
7	Northwestern University	20,128	$52,704	2
8	DeVry University-Illinois	19,417	$30,725	3
9	Loyola University Chicago	15,670	$42,776	4
10	University of Chicago	14,620	$53,310	5
11	Southern Illinois University Edwardsville	13,602	$23,129	-
12	Western Illinois University	13,175	$20,107	-
13	Columbia College Chicago	12,464	$37,215	6
14	Eastern Illinois University	12,040	$18,440	-
15	Northeastern Illinois University	11,193	$21,468	-
16	Construction Apprenticeship Programs	10,811	$0	7
17	Roosevelt University	7,708	$33,606	8
18	Illinois Institute of Technology	7,404	$41,039	9
19	National-Louis University	6,874	$32,480	10
20	Chicago State University	6,820	$21,228	-

Source(s): DOL (2016) – Freedom of Information Act (FOIA) Request; NDBS (2015) – "Illinois Colleges and Universities."

The brief profiles below of a few joint construction trade programs help to illustrate the significant industry investment in building and classroom facilities:

1. The International Union of Operating Engineers Local 150 school in Wilmington has 342,000 square feet of space. It houses an indoor training area with nearly 200 pieces of heavy equipment, 30 classrooms, and a 200-seat auditorium. The facility is located on over 300 acres of land (ASIP Local 150, 2016).
2. The IBEW 134/NECA school has two training facilities, including one in Alsip and one affiliated with Richard J. Daley College in Chicago. Together, the facilities total 140,000 square feet and have 12 classrooms, 8 laboratories, and an IN-TECH Renewable Energy Field (NEAP, 2006).
3. The Illinois Laborers' and Contractors school consists of four facilities in Mount Sterling, Marion, Stanford, and Edwardsville with over 48,000 square feet of classroom space and about 300 acres of training grounds (*Herald-Whig*, 2012).
4. The United Association (Pipefitters) Local 597 school in Mokena has a state-of-the-art training site with 198,000 square feet (Miller, 2010).
5. The Chicago Regional Council of Carpenters operates four schools sites in Chicago, Elk Grove Village, Rockford, and Pekin, with a combined 248,000 square feet and 47 classrooms (Spicca, 2016).

While classrooms and facilities are important educational factors, the most important difference between a construction apprenticeship and the pursuit of a bachelor's degree is in the cost of education assumed by the student (Figure 18). The typical in-state tuition cost to attend the University of Illinois is $24,580

per year. The sticker-price tuition cost of Northwestern University is $52,704 a year. Even Eastern Illinois University, the least-expensive of the universities displayed in Figure 18, costs $18,440 in tuition per year. Meanwhile, a registered apprentice in Illinois has his or her instruction covered by contractors and workers in the construction industry.

Registered apprentices have minimal or no long-term economic debt compared to college students. For young adults attending an Illinois university, the average debt per borrower is $27,303 (Miller, 2015). At 6 percent interest and 120 payments, a worker with a bachelor's degree would pay $36,374 in debt over 10 years (Kantrowitz, 2016). By contrast, the average out-of-pocket expenditures for apprentices amount to $4,056 over four years in upfront costs and average union dues (Reed et al., 2012). Nearly every active apprentice is able to pay these out-of-pocket costs in the year in which they are incurred because apprentices earn money while they are completing on-the-job training.

For many young Illinois workers, enrolling in a registered apprenticeship program is a better option than attending college or university. The opportunity to earn-while-they-learn, free from debt, entices thousands of young adults to enter the trades every year. Over the course of his or her career, the average registered apprentice improves his or her total earnings by $123,906. Assuming that any given individual works 36 years on average over the course of his or her lifetime, the net income gain from a registered apprenticeship program is $3,442 annually.

To compare this positive earnings impact to the impact of earning a college degree in Illinois, a standard ("ordinary least squares") regression analysis was performed using data from the *American Community Survey*. In the *American Community Survey*, the U.S. Census Bureau annually interviews one percent of the total U.S. population. Over the five years from 2010 through 2014, the U.S. Census Bureau surveyed 630,344 total Illinois residents, including 138,357 with a bachelor's degree alone and 51,654 respondents with an advanced degree beyond the bachelor's. Total personal income was adjusted using the Consumer Price Index (CPI-U) and all estimates are adjusted to match the actual Illinois population using supplement weights provided by the U.S. Census Bureau (Ruggles et al., 2015).

The regression controls for an array of important factors. These include demographic variables, such as age, racial identification, gender identification, and immigration status. The analysis also accounts for job variables, such as occupation of employment, industry of employment, and private or public sector status. Finally, the statistical model takes an Illinois worker's county of residence into account (i.e., workers in Lake County tend to earn more than their counterparts in Peoria County).

Comparative results are shown in Figure 19. As noted previously, the average apprentice earns $3,442 in additional annual income from participating in a registered apprenticeship program, or a gain of $119,850 over the course of a construction worker's career after accounting for out-of-pocket training costs. In Illinois, this impact on earnings is greater than the average effect of many bachelor's degrees. Over 36 years, the following bachelor's degrees return a lower benefit than a registered apprenticeship on average, after accounting for student debt: family and consumer sciences (+$84,302), psychology (+$80,608), social work (+$64,994), English language and literature (+$44,287), education administration and teaching (+$41,110), and linguistics and foreign languages (+$38,436).

Note that the ranking of registered apprenticeships is compared to workers who have a bachelor's degree *only* in the specific field. For example, the majority of teachers in Illinois have a master's degree, which returns another $393,334 in lifetime earnings (Figure 19). Thus, the average teacher with a bachelor's degree in "education administration and teaching" (+41,110) *and* a master's degree (+$393,334) receives a

lifetime earnings boost of $434,444. If, however, a potential apprentice instead decides to get a bachelor's degree in education but has no desire to continue towards a master's degree, the economic data presented in Figure 19 suggest that the apprenticeship program may have been a better career path.

FIGURE 19: PERSONAL INCOME GAINS FROM REGISTERED APPRENTICESHIP VS. VARIOUS DEGREES, 2010-2014

Rank	Bachelor's Degree or Other Level of Educational Attainment	Annual Gain	Average Benefit Over 36 Years Minus Average Debt
1	Biology and Life Sciences	$24,260	$739,939
2	Engineering	$23,014	$700,078
3	Business	$18,497	$555,542
4	Computer and Information Sciences	$17,634	$527,917
5	Mathematics and Statistics	$17,619	$527,446
6	Physical Sciences	$16,207	$482,254
7	Social Sciences	$15,550	$461,225
8	History	$10,837	$310,395
9	Communications	$8,284	$228,725
10	Agriculture	$8,073	$221,967
11	Criminal Justice and Fire Protection	$7,992	$219,363
12	Liberal Arts and Humanities	$7,528	$204,507
13	Philosophy and Religious Studies	$7,486	$203,180
14	Medical and Health Sciences and Service	$6,896	$184,292
15	Architecture	$6,016	$156,128
16	Registered Apprenticeship	$3,442	$119,850
17	Family and Consumer Sciences	$3,771	$84,302
18	Psychology	$3,656	$80,608
19	Social Work	$3,199	$65,994
20	English Language and Literature	$2,521	$44,287
21	Education Administration and Teaching	$2,421	$41,110
22	Linguistics and Foreign Languages	$2,338	$38,436
-	Less than High School	-$444	-$15,984
-	High School (Baseline)	$0	$0
-	Associate's Degree	$541	$7,498
-	Master's	$14,744	$392,334
-	Professional, such as a J.D. or M.D.	$44,315	$1,140,807
-	Doctorate	$30,051	$766,440

Source(s): Authors' analysis of Ruggles et al. (2015) – 2010-2014 American Community Survey *and Reed et al. (2012). For full regression results, contact author Frank Manzo IV at fmanzo@illinoisepi.org.*

The baseline for all estimates is earning a high school degree (Figure 19). The impact of not graduating from high school is a loss of $15,984 in career earnings on average. The estimated correlation between earning an associate's degree and annual earnings is a $541 increase in income per year. After college loan debt, the lifetime impact of an associate's degree is just a $7,498 gain in total income. While this positive benefit indicates that obtaining an associate's degree still pays off in Illinois after controlling for other factors, the key takeaway is that a registered apprenticeship program, on average, has a much greater effect on a typical worker's lifetime earnings than an associate's degree. University education pays, but so does a registered apprenticeship.

IMPLICATIONS

Apprenticeable Occupations in Other Industries

While the construction industry accounts for 89.2 percent of all registered apprentices in Illinois (See Figure 7), the economic benefits of registered apprenticeships could be expanded into many other sectors (Figure 20). The U.S. Department of Labor Employment and Training Administration lists 1,060 "apprenticeable occupations," of which only 121 are in construction (11.4 percent) (DOLETA, 2016b). An apprenticeable occupation is any skilled trade that: "is (a) customarily learned in a practical way through a structured, systematic program of on-the-job supervised training; (b) is clearly identified and commonly recognized throughout an industry; (c) involves manual, mechanical or technical skills and knowledge that require a minimum of 2,000 hours of on-the-job supervised training; and (d) requires related instruction to supplement the on-the-job training" (OregonLaws, 2016).

Most of the listed apprenticeable occupations involve similar hours of training as a construction trade (Figure 20). The average hours needed to complete a construction apprenticeship is 6,120 hours, while the average time to complete an accredited non-construction program is 5,631 hours. The median duration for both types of apprenticeships is 6,000 hours.

FIGURE 20: "APPRENTICEABLE OCCUPATIONS" BY OCCUPATION TYPE AND ESTIMATED PROGRAM TERM

DOLETA Determination	Construction	Non-Construction
Number of Apprenticeable Occupations	121	937
Average Hours of Training Required	6,120	5,630
Median Hours of Training Required	6,000	6,000
Construction Share of Apprenticeable Occupations	11.42%	

Source(s): DOLETA (2016b) – "Available Occupations."

Apprenticeable occupations exist in all sectors, from manufacturing to health care to transportation. The following are ten examples, including the typical term to complete a certified program:

1. Beekeeper – 8,000 hours;
2. Computer Programmer – 4,000 hours;
3. Laboratory Tester – 4,000 hours;
4. Paralegal – 6,000 hours;
5. Nurse Assistant – 2,000 hours;
6. Veterinary Technician – 2,000 hours;
7. Corrections Officer – 2,000 hours;
8. Artificial Plastic Eye Maker – 10,000 hours;
9. Machinist – 8,000 hours;
10. Truck Driver – 3,500 hours.

Six Potential Policy Recommendations

There is substantial opportunity and an increasing need for apprenticeship programs in Illinois to improve worker productivity and provide middle-class employment opportunities for workers who are unable to go to college. Construction apprenticeship programs return $3.00 in annual economic output per dollar invested and $10.98 per dollar in long-run economic and social benefits. To advance entire industries and

grow the state economy, steps should be taken to encourage employers– partnering with labor unions wherever possible– to privately finance a registered apprenticeship program.

The reason why apprenticeship programs are not more widespread in Illinois, and in the United States more broadly, is that there are significant barriers to expanding apprenticeships (Olinsky & Ayers, 2013). One barrier is an information problem: many Americans mistakenly think that apprenticeship programs are only appropriate for the construction trades and other historically male-dominated occupations. Another is the long-term decline in union membership. As demonstrated throughout this report, unions have played an important role in offering training programs. In fact, there has been a very strong correlation (0.87) between active apprenticeship programs and union membership rates in America (Olinsky & Ayers, 2013). Declining unionization has coincided with weaker apprenticeship systems. Finally, a third major barrier is the high startup and operational costs to employers of having an apprenticeship program. Employers may also worry that a worker who completes their registered apprenticeship program will leverage their new skills into a better position at a competing firm.

The State of Illinois can enact at least six policies to promote apprenticeship programs across the state:

1. **Improve marketing and outreach to businesses and disadvantaged workers** – The state should increase funding for either the Illinois Department of Employment Security or the Department of Commerce and Economic Opportunity to promote apprenticeship training through dedicated marketing campaigns. The campaigns should engage businesses, demonstrating the value that an initial investment in human capital can have on worker productivity, worker morale, and the bottom line. The state should also target women and people of color in disadvantaged neighborhoods to educate them on the personal benefits of becoming an apprentice (Reed et al., 2012).
2. **Expand access to child care programs** – Female apprentices 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 publicly-provided child care has also been found to support parents entering the workforce overall, so this policy change would have broader economic benefits to Illinois (Kleven, 2014). The state should increase funding for child care programs to support working families and provide thousands of new jobs.
3. **Provide tax credits to businesses that offer apprenticeship programs** – After South Carolina enacted a $1,000 tax credit to employers per apprentice per year, employer-sponsored apprenticeship programs increased by 570 percent in the state. The state could also provide tax credits for small businesses in non-construction sectors to enter into contractual agreements that pool resources together and offer a joint apprenticeship program. Because participating employers would have a shared interest in retaining employees, the contractual agreements could include provisions that prohibit apprentices from working for nonparticipating employers over a defined number of years, except in dire economic conditions (Olinsky & Ayers, 2013).
4. **Expand pre-apprenticeship programs in public high schools** – The State of Illinois should work with existing apprenticeship programs to offer pre-apprenticeship training programs at public high schools, especially in low-income communities. These partnerships would offer workplace skills training, information about careers in apprenticeable occupations, and occupation-specific training, such as a shop class (Olinsky & Ayers, 2013). Chicago Public Schools (CPS) and the Chicago Building Trades have recently announced that Dunbar Vocational High School will establish the

first comprehensive citywide construction trades program to prepare up to 120 students for apprenticeship programs in carpentry; heating, ventilating, and air conditioning (HVAC); welding; electricity; and general construction. Dunbar Vocational High School is located in the Bronzeville neighborhood on the south side of Chicago. CPS is partnering with at least five of the largest apprenticeship programs in Illinois to carry out this initiative (Mayor's Press Office, 2016). High schools across the state should closely monitor the performance of this program and consider initiating their own programs.

5. **Incentivize workers to enter the trades by creating pathways to earn bachelor's degrees at public universities** – Credits for classroom hours earned during apprenticeship programs should be transferable to public universities. While many two-year colleges have articulation agreements with apprenticeship programs that can provide apprentices with associate's degrees upon completing their training, four-year universities have abstained from granting degree credits for apprenticeship training. Universities, for example, can participate in building upon the success of apprenticeship programs by joining the U.S. Department of Labor Employment and Training Administration-sponsored Registered Apprenticeship College Consortium (RACC), which is a "network of Colleges and Registered Apprenticeship Programs working together to provide college-to-career opportunities" (DOLETA, 2015).

6. **Support policies that increase unionization and strengthen prevailing wage** – Trades unions have historically been at the forefront of worker apprenticeship programs. Joint labor-management programs in Illinois train 98.5 percent of the state's construction apprentices and provide 99.2 percent of the investment. Similarly, state prevailing wage laws are associated with increased apprenticeship training and worker productivity. As union membership has declined nationally and prevailing wage laws have been weakened or altogether repealed, apprenticeship training has fallen in tandem. The State of Illinois should promote unionization in construction and other fields and seek to strengthen prevailing wage in order to increase participation in registered apprenticeship programs.

Conclusions

For many young Illinois workers, enrolling in a registered apprenticeship program is a better option than attending college or university. The annual income gain from participating in a registered apprenticeship program is $3,442 on average, or $119,850 in additional income over the course of the worker's career after accounting for out-of-pocket upfront costs. In Illinois, this impact on wages is greater than the average effect of having an associate's degree ($542 per year) and many bachelor's degrees– including social work ($3,199 per year), English language and composition ($2,521 per year), and linguistics and foreign languages ($2,338 per year).

If all registered apprenticeship programs for construction were combined, they would be the 7th-largest private post-secondary educational institution in Illinois. In FY2015, there were 10,811 participants in registered apprenticeship programs in Illinois' construction industry. Cumulatively, those programs invested over $136 million in worker skills upgrading and development – which equates to $0.56 per hour worked for all blue-collar construction workers in the state (union and nonunion alike). The average out-of-pocket expenditures for apprentices amount to $4,056 over four years, compared to average student debt repayments totaling over $36,000 for Illinois residents graduating from a 4-year university.

Joint labor-management apprenticeship programs account for the vast majority of human capital investment in Illinois' construction industry. In FY2015, 98.5 percent of all construction apprentices were

enrolled in joint programs by union contractors. Joint labor-management apprenticeship programs also comprise 99.2 percent of all privately-funded apprenticeship expenditures in Illinois. Average program expenditures per apprentice are $12,715 in joint labor-management programs and only $6,585 in nonunion programs and joint labor-management programs average 3.7 registered apprentices per program employee while nonunion programs have 14.7 apprentices per program employee.

Registered apprenticeship programs in Illinois' construction industry generate substantial economic benefits to the state every year. The programs directly provide 2,871 jobs for instructors and other employees. Through program expenditures and the net on-the-job earnings of participants, registered apprenticeship programs save or create nearly 5,000 total jobs in Illinois and annually boost the state's economy by $408.7 million. Over one year, the economic return on investment (i.e., the ratio of the GDP effect to program expenditures) is $3.00 per dollar spent on worker training. Registered apprenticeship programs in construction also increase state and local tax revenues by $28.6 million every year.

Registered apprenticeship programs have even larger impacts over the long run. Registered apprenticeship programs in Illinois' construction industry provide $1.25 billion in long-term economic benefits to the state. Over the careers of program participants, the federal government receives $101.4 million in additional tax revenues and state and local government tax revenue increases by $98.7 million. The programs also result in significant taxpayer savings, including a $27.1 million reduction in unemployment insurance compensation, a $17.7 million drop in food stamp spending, and a $5.5 million decrease in welfare costs. Over the long run, the economic return on investment from these construction programs is $9.14 per dollar spent on worker training. The return on investment is even greater if government revenue and savings are included: $10.98 per dollar invested.

While the construction industry accounts for 89.2 percent of all registered apprentices in Illinois, the economic benefits of registered apprenticeships could be expanded into many other sectors. The United States Department of Labor lists 1,060 "apprenticeable occupations," of which only 121 are in construction (11.4 percent). The average time to complete an apprenticeship is 5,631 hours in accredited non-construction programs compared to 6,120 hours for the average construction program. From fast-growing occupations such as home health aides, nurse assistants, and computer programmers to traditional occupations like truck drivers, machinists, and corrections officers, there is substantial opportunity and an increasing need for apprenticeship programs to improve worker productivity, support the middle class, and grow the economy.

The State of Illinois can enact six potential public policies to promote registered apprenticeship programs. The State of Illinois should improve marketing and outreach, expand access to child care programs, provide tax credits to businesses that offer apprenticeship programs, expand pre-apprenticeship programs in public high schools, create pathways to transfer credits to bachelor's degrees, and support policies that increase unionization and strengthen prevailing wage.

Apprenticeship programs have positive social and economic impacts in Illinois. The programs benefit workers by improving their skills and growing their incomes. The programs also benefit employers by addressing skills shortages through a supply of safe, productive workers. Funded almost entirely through partnerships between employers and labor unions, apprenticeship programs in construction also benefit the public by ensuring high-quality infrastructure and products, growing the state economy by $1.25 billion over the long run, and improving the budgets of state and local governments.

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