

April 2, 2014

Work-Based Learning to Expand Jobs and Occupational Qualifications for Youth

By Harry J. Holzer and Robert I. Lerman

Young Americans face serious challenges in making a successful transition to adulthood. Increasingly, good-paying careers require some postsecondary credential and work experience, yet many are unable to earn the necessary credentials to enter rewarding careers. Moreover, joblessness has reached new highs for young people in their early 20s. Among 23- to 24-year-olds not attending school, 28 percent were not employed in 2013, up from about 20 percent in 2000-01. Though part of the decline in youth employment is associated with increased school enrollment, about half or more of the drop in jobs results from a rising share neither working nor in school. As of 2013, about one in three black 23- to 24-year-old men were neither working nor in school.¹ These weak employment figures partly reflect the slow recovery from the Great Recession and partly a long-term decline. Particularly worrisome are the long-term impacts of this low employment, as the loss of appropriate work experience inflicts damage for many years to come.²

The difficulties experienced by recent youth cohorts in obtaining postsecondary credentials persists despite high enrollment rates of young high school graduates at two-year and four-year colleges. But completion rates among enrollees at two-year institutions and the least-prestigious four-year schools, where the disadvantaged tend to concentrate, are low.³ Many young people arrive with weak academic preparation and are steered to remedial classes that they often fail to successfully complete, thereby ending their postsecondary careers.⁴ And even among those who obtain certificates or degrees, a lack of information

¹ The figures come from tabulations by the authors of March 2013 Current Population Survey data.

² For evidence on long-term scarring among young people who enter the job market after a serious recession see Lisa Kahn, "The Long-Term Labor Market Consequences of Graduating From College in a Bad Economy," *Labour Economics* 17(2), 2010, and Molly Dahl, Thomas DeLeire, and Jonathan Schwabish, "A Lost Generation? The Impact of High Unemployment Rates at College Graduation on Long-Term Earnings," unpublished manuscript, Congressional Budget Office, Washington DC, 2013.

³ For evidence on and discussions of declining completion rates among college enrollees, see John Bound, Michael Lovenheim, and Sarah Turner, "Why Have College Completion Rates Declined? An Analysis of Changing Student Preparation and Collegiate Resources," National Bureau of Economic Research Working Paper, Cambridge MA, 2009. Also see Baum et al. (2013) for a discussion of low completion rates and potential policy responses among Pell grantees.

⁴ The generally weak and sometimes negative effects of remedial (or "developmental") education at colleges are documented in Eric Bettinger, Angela Boatman, and Bridget Terry Long, "Student Supports: Developmental Education and Other Academic Programs," *The Future of Children*, Princeton-Brookings, Vol. 1, 2013, and Charles Clotfelter,

about the job market and appropriate career counseling, as well as limited campus teaching capacity in high-demand fields, ensure that many students obtain postsecondary credentials with only limited labor market value.⁵ Young men are particularly vulnerable; they obtain far fewer postsecondary degrees than do young women.

While these difficulties are well known, policies to improve youth schooling and labor market outcomes are limited by the lack of evidence concerning what works and by tight fiscal environments at the state and federal levels. Political polarization at the federal level contributes to the problem as well, especially hindering the ability of Congress and the President to agree on job creation, training, and other interventions in the labor market.

Improving Youth Employment and Skills

There is an approach to improving youth skills and employment that avoids big increases in government spending, that builds on existing evidence, that can appeal to people across the ideological spectrum. The approach is to expand *work-based learning* or “earning while learning” models. Such a policy can contribute to full employment directly by stimulating the growth of jobs for youth, the demographic group with the highest unemployment rates. An indirect contribution to full employment comes from enhancing job skills directly relevant to productivity, thereby increasing competitiveness, production, and labor demand in the United States.

Work-based learning takes many forms. We often find it in the most successful high school career and technical education programs, such as Career Academies, and it is a cornerstone of “career pathway” programs that are being developed for younger and older adults at community colleges. For those who are not formally in school, work-based learning includes internships, externships, or co-op arrangements at private businesses.⁶

Perhaps the most intensive use of work-based learning takes place in apprenticeships, contractual arrangements between private employers and workers that prepare workers to master an occupation. These arrangements are particularly well-suited to prepare young people for “middle-skill” careers in

Helen Ladd, Clare Muschkin, and Jacob Vigdor, “Developmental Education in North Carolina’s Community Colleges,” CALDER Working Paper, American Institutes for Research, Washington DC, 2013.

⁵ See Louis Jacobson, and Christine Mokher, *Pathways to Boosting the Earnings of Low-Income Students by Increasing Their Educational Attainment* (New York: Hudson Institute Center for Employment Policy), 2009, for a discussion of how limited information on labor market rewards by field tends to distort the choices of field of study among young people. Many public institutions also limit their course offerings in high-demand fields because of the relatively high cost of equipment and instructors in these fields, and because, in states where higher education subsidies are provided at a per-student basis regardless of completion rates or labor market outcomes of students, they face limited financial incentives to offer these courses. See the National Council of State Legislators, “Performance-Based Funding for Higher Education,” 2013 (<http://www.ncsl.org/research/education/performance-funding.aspx>), for a discussion of states that are beginning to base subsidies for institutional performance along these lines.

⁶ See James Kemple, *Career Academies: Long-Term Impacts on Work, Education, and Transitions to Adulthood* (New York: MDRC), 2008, for evidence on the success of Career Academies, and David Fein, “Learning What Works in Career Pathway Programming: The ISIS Evaluation,” draft, Abt Associates, Bethesda MD, 2013, for a discussion of career pathways. For evidence on a variety of work-based learning approaches, see David Neumark, ed., *Improving School-to-Work Transitions* (New York: Russell Sage Foundation), 2006.

sectors such as health care, advanced manufacturing, construction, and information services where labor demand will remain fairly strong over time and employers have difficulty meeting these demands.⁷

Work-based learning has a number of advantages over other educational or training programs. Perhaps the most important is that students do not have to choose between enhancing their educational credentials or their work experience; with work-based learning they can improve both. The real world experience that students gain in work-based learning can offset the widespread loss of regular, full-time employment among young workers today. In some work-based settings, such as apprenticeships, young people are employees; they are paid and are expected to contribute to the production process.

Along with their paid work experience, students can pursue postsecondary credentials as well. Indeed, the rates at which they earn these credentials and the labor market rewards they gain from obtaining them might actually be higher in a work-based learning setting than elsewhere. For one thing, disadvantaged students often seem more motivated to learn when they are paid to do so. Persistence rates in such programs tend to be higher, as are completion rates. Students see a direct link between what they learn in the classroom and problems in applied settings; put succinctly, they engage in *contextualized learning*, a successful learning environment for young people, especially those not entirely successful in traditional academic settings.⁸

Increasingly, work-based learning programs involve partnerships between employers or industry associations on the one hand and community colleges and other postsecondary training providers on the other.⁹ These programs often lead students to earn associate degrees in high-demand fields that have more labor market value than do more traditional occupational certificates. Because of this, work-based learning models should no longer be viewed as competitors or *substitutes* for higher education, but should instead be seen as their *complements*, especially for disadvantaged students or those with weaker academic backgrounds.

Work-based learning models generally have two other attributes that improve their prospects for success: *low government costs* and *benefits for private-sector employers*. The costs to the government are low mainly because employers pay for the work and work-based training of participants. Participants sometimes receive below-market wages, in part to compensate for the possibility that they may leave the first employer financing the next employer's training. Yet the training is sufficiently general to raise the worker's productivity both within the training firm and in other firms, and many firms are willing to bear some costs of their workers' training.¹⁰

⁷ For a discussion of middle-skill jobs and why demand there will not disappear over time, see Harry Holzer and Robert Lerman, *America's Forgotten Middle-Skill Jobs: Education and Training Requirements for the Next Decade and Beyond* (Washington DC: Workforce Alliance), 2007, and Harry Holzer, *Is the Middle of the Job Market Really Disappearing? Comments on the Polarization Hypothesis* (Washington DC: Center for American Progress), 2010.

⁸ For discussions of the potential of work-based learning to advance educational attainment among disadvantaged students, see Nancy Hoffman, *Schooling in the Workplace* (Cambridge MA: Harvard Education Press), 2011, and Harry Holzer, Dane Linn, and Wanda Monthey, *The Promise of High-Quality Career and Technical Education* (Washington DC: College Board), 2013.

⁹ For a discussion of how apprenticeships are now becoming more widely available at community colleges, see Robert Lerman, *Expanding Apprenticeship: A Way to Enhance Skills and Careers* (Washington DC: Urban Institute), 2010.

¹⁰ While Gary Becker, in *Human Capital* (Chicago: University of Chicago Press), 1996, argued that employers would not pay for general training of their employees, Daron Acemoglu and Jorn-Steffen Pischke, in "Why Do Firms Train? Theory and Evidence," *Quarterly Journal of Economics* 117(1), 1998, argue that employers will do so when they have more information than other employers about the productivity of these employees and how it has been enhanced by on-the-job training.

Employers often benefit from work-based learning arrangements. For one thing, employers can use workers' services for production during the training period. In many cases the programs also help employers generate their own highly skilled workers internally, instead of having to recruit and hire the workers externally. Because employers have provided the training and observed the trainees over time, the companies avoid much of the uncertainty and doubts about whether the training and the workers are of sufficient quality and sufficient relevance to the tasks that need to be performed. And, since work-based learning occurs only when actual jobs are being created, the programs should result in less displacement of similarly trained workers than is the case with more general training programs.

Indeed, the benefits to both workers and employers are why many countries have maintained and other countries have expanded apprenticeship and other work-based learning forms of training. The experiences of the Siemens Corporation and other German companies going this route have been widely reported, and their activities are actively supported by the German embassy here. And such approaches seem to be gaining popularity even among U.S.-based employers, such as those whose chief executives are members of the Business Roundtable, which encourages employers to provide more training to prospective or actual workers.¹¹

But if work-based learning is so beneficial to private employers, why don't more employers provide it? The answers are complex. One is that various market failures likely inhibit the broader adoption of these programs by U.S. employers. Market failures include imperfect information about the programs' benefits and how obtain them. Among workers, a reluctance to forgo higher wages early on creates a form of wage rigidity that can limit a firm's ability to pay lower wages during the training period.

Since there are fixed costs with setting up work-based learning models, many small employers do not have sufficient scale to implement them. Also, since firms provide "public goods" to their workers and other employers when they train, these public goods will be underprovided (from society's point of view) in purely private-sector markets. Furthermore, capital market failures might generate "liquidity constraints" among these employers that limit the programs' adoption.

Historically, institutional arrangements such as unionism have made it easier for employees to gain such training, since unions lift the cost burdens of providing training from particular employers. The dramatic declines over time in private-sector unionism might thus have contributed to declining employer-provided training, at least in some sectors (like construction and manufacturing).

More broadly, many American employers and their industries simply lack a tradition of investing in the skills of their workers, and look for workers to arrive at their firms with the needed skills. American firms, more frequently than their overseas counterparts, view their workers as temporary inputs only, not meriting long-term investment. Some American employers, to be competitive, take the "high road" in compensation and invest more heavily in their workers' productivity, while others seek only to minimize their labor costs. The differences between employers who choose each respective strategy often depend

¹¹ For two recent articles about German companies encouraging the spread of apprenticeships in the U.S., see Nelson Schwartz, "Where Factory Apprenticeship Is Latest Model From Germany," *New York Times*, November 30, 2013, and Howard Schneider, "Recasting High School, German Firms Transplant Apprentice Model to U.S.," *Washington Post*, November 27, 2013. See also the Business Roundtable, *Taking Action on Education and Worker Preparedness*, draft, Washington DC, 2013, for encouragement of more investments in worker skills, and Alexei Montserrat, *Training Our Future: Skill Workers and the Revival of American Manufacturing* (Washington DC: Atlantic Council), 2013 as well.

on informational differences between them and on differences in traditions and the personal outlooks of their owners and managers.¹²

Under these circumstances, a modest amount of technical assistance and/or financial incentives provided by the public sector could overcome firms' inertia (and perhaps modest fixed costs) and successfully induce them to generate work-based learning modes of training.¹³ Apprenticeship is one model of work-based learning that is particularly promising. The next section discusses its potential for expanding the jobs and skills of American youth.

Why Apprenticeships?

Apprenticeship is a time-honored method for preparing workers to master occupational skills and achieve career success. Under apprenticeship programs, individuals undertake productive work for their employers; earn a salary receive training primarily through supervised, work-based learning; and take academic instruction that is related to the apprenticeship occupation. The programs generally last from two to four years. Apprenticeships help workers master not only relevant occupational skills but also other work-related skills, including communication, problem-solving, resource allocation, and interaction with supervisors and a diverse set of co-workers. The coursework is generally equivalent to at least one year of community college. Completing apprenticeship training yields a recognized and valued credential attesting to mastery of skill required in the relevant occupation.

Apprenticeships are particularly worthwhile in enhancing youth development. Young people work with an adult mentor who can guide them but also allow them to make their own mistakes. Youth see themselves judged by the established standards of a discipline, including deadlines and the genuine constraints and unexpected difficulties that arise in the profession. Supervisors provide the close monitoring and frequent feedback that helps apprentices keep their focus on performing well at the work site and in the classroom. Unlike the usual part-time jobs held by high school and college students, apprenticeships integrate what young people learn on the job and in the classroom.

Apprenticeship is particularly appealing as a way of integrating minorities, especially minority young men, into rewarding careers. Having learning take place mostly on the job, making the tasks and classroom work highly relevant to their careers, and providing participants wages while they learn can give minorities increased confidence that their personal efforts and investment in skill development will pay. In addition, mastering a skill by completing an apprenticeship gives graduates a genuine sense of occupational identity and pride.

The financial gains to apprenticeships are strikingly high. U.S. studies indicate that apprentices do not have to sacrifice earnings during their education and training and that their long-term earnings and benefits

¹² For a series of case studies that explore why some firms choose "high-road" compensation practices and others do not, often in the same industries and local labor markets, Eileen Appelbaum, Annette Bernhardt, and Richard Murnane, *Low-Wage America* (New York: Russell Sage Foundation), 2003.

¹³ Laurie Bassi and Jens Ludwig, in "School-to-Work Programs in the United States: A Multi-Firm Case Study of Training, Benefits, and Costs," *Industrial and Labor Relations Review* 53(2), 2000, argue that the costs of setting up school-to-work programs often exceed the benefits for many companies, especially in the short-term, and therefore that employers might need some public subsidies to do so.

exceed the gains they would have accumulated after graduating from community college.¹⁴ The net increases in earnings far outweigh the costs to government. One study found that apprenticeships return nearly \$28 in benefits for every dollar of government and worker costs.¹⁵ Since apprenticeships are driven by employer demand, mismatches between the skills taught and supplied and skills demanded by employers are less likely to occur than when training is provided in school- or community-based courses.

Employers benefit as well. Rigorous studies reveal substantial gains for German and Swiss employers. One striking feature of apprenticeships in both countries is how quickly apprentices ascend from unskilled to skilled tasks. Although Swiss firms spend more than German firms, they derive substantially higher benefits from the value added by apprentices. German firms also recoup their costs in the production process while retaining more of the trained apprentices. In the United States, in a survey of over 900 employer sponsors of apprenticeship, the overwhelming majority report their programs are valuable and involve net gains.¹⁶

The added demand for workers employed in apprenticeships can play a major role in reducing youth joblessness. In Austria, Germany, and Switzerland, all countries with robust apprenticeship systems, the unemployment rate of 15- to 24-year-olds is well under 9 percent, far below the 24 percent rate in France, the 35 percent rate in Italy, and the 18 percent rate in Finland. Given the success of apprenticeships in employing and raising the skills of youth, the International Labor Organization, the Organization for Economic Cooperation and Development, and other international organizations are encouraging countries to expand apprenticeship training.

Expanding apprenticeships encourages employers to bring more non-college workers into jobs that initially involve only modest skill but after extensive training become highly skilled. The infrastructure of apprenticeship fosters high expectations by employers and ultimately leads them to enhance the skill demands of their jobs, since they know that apprentices will be a ready source of workers who can ultimately meet their demands. By having apprentices available to undertake a range of tasks that increase in complexity over time, employers have fewer incentives to substitute expensive capital equipment for employees. Unlike others who start by performing basic tasks, apprentices have a great deal of motivation to complete their tasks with care and quality.

Apprenticeships have expanded rapidly in several advanced economies; they have tripled in Australia since 1996 and have jumped by a factor of 16 to over 850,000 in England since 1990.¹⁷ These countries use apprenticeships not only for construction and manufacturing positions but also in a wide array of other fields, including nursing, information technology, security, and finance occupations.

¹⁴ See Kevin Hollenbeck, "Sensitivity Testing of Net Impact Estimates of Workforce Development Programs Using Administrative Data," Upjohn Working Papers and Journal Articles 08-139, W.E. Upjohn Institute for Employment Research, Kalamazoo MI, 2008.

¹⁵ See Deborah Reed et al., *An Effectiveness Assessment and Cost-Benefit Analysis of Registered Apprenticeship in 10 States* (Washington DC: Mathematica Policy Research), 2012.

¹⁶ See Robert Lerman, Lauren Eyster, and Kate Chambers, 2009. "The Benefits and Challenges of Registered Apprenticeship: The Sponsors' Perspective." Washington, DC: U.S. Department of Labor, Employment and Training Administration. http://www.urban.org/UploadedPDF/411907_registered_apprenticeship.pdf.

¹⁷ See the report on apprenticeship by Erica Smith and Ros Brennan for the ILO and World Bank, at http://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---sro-new-delhi/documents/publication/wcms_234728.pdf. Also see Britain's apprenticeship data at <https://www.gov.uk/government/statistical-data-sets/fe-data-library-apprenticeships>.

Expanding Apprenticeships in the United States

The current levels of apprenticeship are strikingly low in the United States compared to other advanced countries, including countries with relatively free labor markets. Apprenticeships make up only 0.2 percent of the U.S. labor force, far less than the 2.2 percent in Canada, 2.7 percent in Britain, and 3.7 percent in Australia.¹⁸ The recent and significant expansions of apprenticeships in South Carolina, discussed below, suggest that employers in the United States can be convinced to invest in rigorous training that leads to occupational credentials.

But can apprenticeship become a serious jobs and training strategy for American youth? One complication is that the current U.S. registered apprenticeship system is almost entirely divorced from high schools and serves few workers under age 25; only a few states now operate youth apprenticeship programs that provide opportunities to 16- to 19-year-olds. Still, with sufficient resources, the models now operating in Georgia and Wisconsin could be replicated and expanded to reach hundreds of thousands and perhaps millions of American youth.

With little or no federal support, youth apprenticeship programs in Georgia and Wisconsin have provided valued occupational training since the early 1990s. State funding pays for coordinators in local school systems and sometimes for required courses not offered in high schools. In Georgia, 143 out of 195 school systems are currently participating in the apprenticeship program, and 6,776 students are participating. These apprentices engage in at least 2,000 hours of work-based learning as well as 144 hours of related classroom instruction. Industry sectors offering apprenticeships range from business, marketing, and information management to health and human services and technology and engineering. The Wisconsin program includes one-to-two-year options for nearly 2,000 high school juniors or seniors, requiring from 450 to 900 hours in work-based learning and two to four related occupational courses. The program draws on industry skill standards and awards completers with a certificate of occupational proficiency in the relevant field. Some students also receive technical college academic credit. The sectors providing apprenticeships include food and natural resources, architecture and construction, finance, health sciences, tourism, information technology, distribution and logistics, and manufacturing. In both states, employers receive no subsidy yet pay apprentices at least the minimum wage and provide incremental wage increases as apprentices make progress in the program. State spending on the programs amounts to about \$3 million in Georgia and \$2 million in Wisconsin, or about 8 to 15 percent of annual costs on a per-student basis.

Although these programs reach only a modest share of young people, replicating the numbers in Georgia throughout the country would translate to about 250,000 quality jobs and learning opportunities. An increase in apprenticeships of this magnitude would represent a 23 percent jump in the employment of 16- to 17-year-olds; devoting half of these positions to minorities would boost their job-holding by 42 percent.¹⁹ The gross costs of such an initiative would be only about \$105 million, or about \$450 per student-year or about 4 percent of current school outlays per student-year. Moreover, some of these costs would be offset by reductions in teaching expenses, as more students spend more time in work-based learning and less time in high school courses. In all likelihood, the modest investment would pay off handsomely in the form of increased earnings and associated tax revenues as well as reduced spending on educational and other expenditures.

¹⁸ See Smith and Brennan (2013).

¹⁹ These results are based on tabulations by the authors from the March 2013 Current Population Survey.

The expansion of apprenticeship in South Carolina offers another example of sizable gains in jobs and training at modest costs. The budget for Apprenticeship Carolina is about \$1 million per year, plus tax credits to employers of \$1,000 per year per apprentice. Given the nearly 3,500 in added apprenticeships induced by Apprenticeship Carolina, the costs per apprentice amount to about \$1,300 per apprentice-year, once the costs of the tax credit are included.

Expanded funding for apprenticeships in general and youth apprenticeships in particular can generate a wide range of quality jobs and training pathways for hundreds of thousands and ultimately millions of young people. Although a number of new apprenticeship slots would materialize quickly, it will take a few years to reach the appropriate scale sufficient to provide new opportunities to a large share of young people. Britain's experience demonstrates that leadership, funding, and marketing can generate the momentum to increase apprenticeship slots fivefold in six years. Replicating this expansion in the United States would allow apprenticeship opportunities here to reach 1.5 to 1.6 million, or an increase of 1.2 million jobs with serious training.

Apprenticeships can work well for many adults in combination with the earned income tax credit (EITC). Although apprenticeships generally lead to high-wage jobs, the earnings of those in an apprenticeship can be low relative to the needs of their families. During this period, the EITC can play an effective role in supplementing the earnings of adult apprentices, especially those with children. Apprenticeship interacts with the minimum wage in two ways. Raising the wage threshold for regular adult workers gives employers the incentive to raise the skill levels and productivity of their workforce high enough to justify the increased labor cost. On the other hand, a relatively high minimum wage applied to apprentices can discourage employers from starting apprenticeships. Allowing a sub-minimum wage for the first three to six months of an apprenticeship might be one way to offset any such disincentive while sustaining the incentive for raising the skills of the permanent workforce.

Conclusions

The problems associated with high youth unemployment continue to fester in the United States, leading to increases in poverty, social problems, and adult unemployment. Yet interest in this issue has waned since the late 1970s, as the focus has shifted toward raising academic achievement and letting the labor market take care of everything else. Regrettably, not enough policymakers have recognized that the “academic only” approach does not work for many, perhaps most, young people. Fortunately, we do not have to be content with high levels of joblessness and weak human capital development for American youth. An alternative model — one based on combining work and work-based learning with academic instruction — is available and highly effective not only in reducing youth unemployment but also in increasing long-term earnings. As Austria, Germany, and Switzerland have shown, a robust apprenticeship system can lower youth unemployment to about 6 to 7 percent while reducing the costs of education and increasing the skills available to employers. Whether or not the United States embraces this approach, we should learn from the principles of extensive work-based learning and of creating jobs alongside a relevant program of education and training.

Expanding work-based learning, especially through apprenticeships, offers a clear path toward helping large numbers of American young people find jobs that can yield income and provide the prerequisites for a rewarding career in the future. After decades of neglecting the employment prospects of America's youth, now is time for action.

References

- Acemoglu, Daron and Jorn-Steffen Pischke. 1998. "Why Do Firms Train? Theory and Evidence." *Quarterly Journal of Economics*. Vol. 117 No. 1.
- Appelbaum, Eileen; Annette Bernhardt and Richard Murnane. 2003. *Low-Wage America*. New York: Russell Sage Foundation.
- Bassi, Laurie and Jens Ludwig. 2000. "School-to-Work Programs in the United States: A Multi-Firm Case Study of Training, Benefits, and Costs ." *Industrial and Labor Relations Review*, Vol. 53, No. 2.
- Baum, Sandra et al. 2013. *Rethinking Pell Grants*. Washington DC: The College Board.
- Becker, Gary. 1996. *Human Capital*. Chicago: University of Chicago Press.
- Bettinger, Eric; Angela Boatman and Bridget Terry Long. 2013. "Student Supports: Developmental Education and Other Academic Programs." *The Future of Children*, Vol. 1.
- Bound, John; Michael Lovenheim and Sarah Turner. 2009. "Why Have College Completion Rates Declined? An Analysis of Changing Student Preparation and Collegiate Resources." NBER Working Paper, Cambridge MA.
- Business Roundtable. 2013. *Taking Action on Education and Worker Preparedness*. Draft, Washington DC.
- Clotfelter, Charles; Helen Ladd, Clare Muschkin and Jacob Vigdor. 2013. "Developmental Education in North Carolina's Community Colleges." CALDER Working Paper, American Institutes for Research, Washington DC.
- Dahl, Molly; Thomas DeLeire and Jonathan Schwabish. 2013. "A Lost Generation? The Impact of High Unemployment Rates at College Graduation on Long-Term Earnings." Unpublished manuscript, Congressional Budget Office, Washington DC.
- Fein, David. 2013. "Learning What Works in Career Pathway Programming: The ISIS Evaluation." Draft, Bethesda MD: Abt Associates.
- Hoffman, Nancy. 2011. *Schooling in the Workplace*. Cambridge MA: Harvard Education Press.
- Hollenbeck, Kevin. 2008. "Sensitivity Testing of Net Impact Estimates of Workforce Development Programs Using Administrative Data," Upjohn Working Papers and Journal Articles 08-139, W.E. Upjohn Institute for Employment Research, Kalamazoo MI.
- Holzer, Harry. 2010. *Is the Middle of the Job Market Really Disappearing? Comments on the Polarization Hypothesis*. Washington DC: Center for American Progress.
- Holzer, Harry and Robert Lerman. 2007. *America's Forgotten Middle-Skill Jobs: Education and Training Requirements for the Next Decade and Beyond*. Washington DC: The Workforce Alliance.
- Holzer, Harry; Dane Linn and Wanda Monthey. 2013. *The Promise of High-Quality Career and Technical Education*. Washington DC: The College Board.

Jacobson, Louis and Christine Mokher. 2009. *Pathways to Boosting the Earnings of Low-Income Students by Increasing Their Educational Attainment*. New York: Hudson Institute Center for Employment Policy.

Kahn, Lisa. 2010. "The Long-Term Labor Market Consequences of Graduating from College in a Bad Economy," *Labour Economics* Vol. 17(2).

Kemple, James. 2008. *Career Academies: Long-Term Impacts on Work, Education and Transitions to Adulthood*. New York: MDRC.

Lerman, Robert. 2010a. *Expanding Apprenticeship: A Way to Enhance Skills and Careers*. Washington DC: Urban Institute.

Lerman, Robert, Lauren Eyster, and Kate Chambers. 2009. "The Benefits and Challenges of Registered Apprenticeship: The Sponsors' Perspective." Washington, DC: U.S. Department of Labor, Employment and Training Administration. http://www.urban.org/UploadedPDF/411907_registered_apprenticeship.pdf

Montserrat, Alexei. 2013. *Training Our Future: Skill Workers and the Revival of American Manufacturing*. Washington DC: The Atlantic Council.

National Council of State Legislators. 2013. "Performance-Based Funding for Higher Education." <http://www.ncsl.org/research/education/performance-funding.aspx>

Neumark, David. ed. 2006. *Improving School-to-Work Transitions*. New York: Russell Sage Foundation.

OECD. 2009. *Learning for Jobs*. Paris: Organization for Economic Development and Cooperation.

OECD. 2010. *Off to a Good Start: Jobs for Youth*. Paris: Organization for Economic Development and Cooperation.

Reed, Deborah et al. 2012. *An Effectiveness Assessment and Cost-Benefit Analysis of Registered Apprenticeship in 10 States*. Washington DC: Mathematica Policy Research.

Schneider, Howard. 2013. "Recasting High School, German Firms Transplant Apprentice Model to US." *The Washington Post*, November 27.

Schwartz, Nelson. 2013. "Where Factory Apprenticeship is Latest Model from Germany." *The New York Times*. November 30.

Smith, Erica and Ros Brennan Kemmis. 2013. *Towards a model apprenticeship framework: a comparative analysis of national apprenticeship systems*. International Labour Organisation and The World Bank.