Career Apprenticeships and Youth Development

How Apprenticeship Approaches Can Spur Upward Mobility in the United States

Prepared for the Thomas B. Fordham Institute's Education for Upward Mobility Conference, December 2, 2014. Draft and not for citation without author's permission.

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Introduction

The United States faces a pressing economic challenge: the weakening of the middle class. Slow economic growth, the stagnancy of wages in middle-wage jobs, and the decline of the two-parent family have all contributed to the problem. Young people are facing high unemployment and underemployment that may limit their long-term success. Young men, particularly those from low- and even middle-income families, are falling behind in schools and experiencing large declines in job prospects. Their inability to earn a good salary and to find satisfying jobs with upward mobility likely contributes to the large increase in female-headed families and delays in starting viable, two-parent families. Meanwhile, many firms, especially in manufacturing, are experiencing difficulties when hiring workers with relevant occupation skills. Can any policies and public-private initiatives change these realities?

State and federal governments have attempted to increase skills, mobility, and earnings almost entirely through an "academic-only" strategy. Unfortunately, the results are uneven at best. Although the vast majority of high school graduates attend college, only about 40 percent of American workers ages twenty-five to thirty-four achieve an associate's or bachelor's degree. For each full-time-equivalent student at a two-year public college, federal, state, and local governments spend about $11,400 per year. Yet only about 20 percent graduate within one-and-a-half times the normal period; for black students, the graduation rate is only about 11 percent.

Expanding apprenticeship training can make a major difference in these outcomes. What is apprenticeship? Apprenticeship is an approach that combines classroom-based vocational education, structured work-based learning, and paid work and production aimed at helping workers to master an occupation. Apprenticeships are subject to externally imposed training standards, particularly for their workplace component. They usually last between two and four years and lead to a recognized credential certifying the apprentice's capabilities to perform the required tasks of a fully qualified worker in the occupation. In the United States and many other countries, apprenticeship takes place after high school when the participant is twenty years old (or older).[1] Unlike internships, apprenticeships require far more in-depth training, involve paid work, and lead to a recognized occupational credential. Unlike paid work experience, apprentices learn skills in formal classes and absorb their learning at the workplace in a highly structured setting.

Overall, the evidence demonstrates that apprenticeships: 1) increase earnings of participants; 2) increase productivity and yield positive returns to firms; 3) enhance the quality and pay in jobs not requiring a bachelor's degree; 4) can expand substantially with modest government funding; 5) yield long-run savings of public money by lessening the need for high cost, post-secondary education; 6) rely on learning by engaging in real production and earning while learning; 7) offer routes to rewarding careers not tied to an academic-only approach; 8) avoid the pitfalls of other training programs that are a poor fit for employer needs; 9) improve the transition from school to careers; and 10) provide a sense of occupational pride and identity in apprentice graduates.

The next sections briefly explain how apprenticeship systems work and describe the benefits of apprenticeship to individuals and society. I then look at specific programs that show promise at the high school, post-secondary, and college levels. The paper concludes with recommendations for policy changes that can help bring apprenticeship to scale—and make apprenticeship options as accessible as traditional higher education.

How Do Apprenticeship Systems Work, Globally and in the United States?

Apprenticeship is a mainstream method for preparing for careers in a number of countries.[2] In Austria, Germany, Switzerland, and Denmark, apprenticeships take place during upper-secondary education or early post-secondary education institutions.[3] Students typically enter apprenticeships by age seventeen and combine paid work, a work-based learning component, and a classroom-based component to gain the skills required to earn a credential in a specific profession. In several countries, the majority of all students enter apprenticeships (70 percent in Switzerland). To engage such high shares of youth, apprenticeship systems cover a wide range of occupations, well beyond the construction and manufacturing trades. Tax specialist, hotel manager, costume designer, police, marketing designer, dental technician, and air traffic controller are a few of the hundreds of occupations in which employers use apprenticeships as the primary approach to training and ensuring a qualified workforce.[4]

In all countries, employers provide the structured work-based learning based on skill standards for the relevant occupation, pay the wages of apprentices, and assign trainers and mentors to work with apprentices. The apprentices are employees who contribute to the production process and are simultaneously students taking one or more courses.

Countries that primarily involve adults as apprentices, including Canada and the United States, generally cover smaller shares of the population and fewer occupations outside the traditional trades. Still other countries offer large numbers of apprenticeship opportunities to both youth and adults.

Generally, training can be undertaken at a public training provider funded by the government or at a range of other training providers. For example, in Canada the training might be at a public college, a private training provider, or a union training center; in France, the centers may be run by private organizations, companies, or chambers. Countries sometimes use higher education institutions as training providers, but companies sometimes build their own courses. In Australia, companies and other organizations can be registered as a training provider and provide the "off-the-job" training for their apprentices or trainees in-house.

Countries vary in their certification and credentialing processes. Germany is well known for developing standards through a tripartite system involving labor, businesses, and the government—and by using Chambers of Commerce to test apprentices and ensure quality. In the United States, the system is quite decentralized. While the Office of Apprenticeship (OA) sends certifications of completion to apprenticeship sponsors when their apprentices

complete their programs, OA lacks the resources to monitor the effectiveness of the training. In union-management (or joint) programs in the United States, unions play a central role in ensuring quality.

Another key function is marketing to employers. In mature systems, where apprenticeships are a well-known phenomenon, companies can simply increase or decrease apprentice offers as their skill needs change. Most will know how to engage academic partners and how to recruit apprentices. In other areas, direct marketing to employers is necessary, as is the provision of general information and even branding. England's ability to scale its apprenticeship program from about 150,000 in 2006–2007 to over 800,000 today depended in part on the activities of private training providers and units in further education colleges to market apprenticeships to employers. Governments have provided incentives for these training institutions to sell these services to employers. Similarly, South Carolina's success at scaling its apprenticeship programs is in no small part due to the effectiveness of the staff of Apprenticeship Carolina.

Apprenticeships are sometimes perceived to be holdover institutions that work only in the context of highly regulated labor markets, such as those in many European countries. As an example, a common misperception is that apprenticeship is an example of German exceptionalism and Germany's cultural heritage. By implication, adopting a robust apprenticeship system is unrealistic in the United States because it lacks the appropriate culture and regulated labor market of Germany. In fact, it is the United States, not Germany, which is the outlier. Most industrial countries—even those with unrelated labor markets—have much larger apprenticeship programs than the United States. Apprentices make up 3.7 percent of Australia's work force, 2.2 percent of Canada's, and 2.7 percent of Britain's. In stark contrast, apprentices make up only 0.2 percent of the American labor force.

The Evidence on Apprenticeships

Robust apprenticeship systems fundamentally influence the transition to jobs and careers, employer recruitment and training policies, credentials recognizing skill attainment, and the relationships among schools and employers. Large-scale apprenticeship systems can create network effects. Having many employers offer apprenticeships makes it easy for new employers to do so; wide dissemination of information about apprenticeship improves the likelihood that workers and businesses will see the benefits of participating; an abundance of apprenticeship opportunities lowers the unit costs of providing related courses through education and training organizations. Most studies are unable to account for these network effects, but they do cover how individual programs affect skills, productivity, and the economic returns to firms. This section examines the evidence from these studies.

Apprenticeship and Economic Returns to Workers

What is the economic return to workers from investing in apprenticeship? Do the gains persist in the long run—or are short-term gains offset by long-term losses? In particular, in teaching mastery of an occupation, do apprenticeships weaken the mobility of workers to

move to other, high-wage occupations?

The two most in-depth studies of the American experience find high economic returns to apprentices. One study examined individuals using employment offices in Washington State. The study matched individuals entering apprenticeships with other individuals with the same pre-program earnings and same age and sex. Within two and a half years of completing the program, apprentices accumulated $78,000 more in earnings and fringe benefits than a comparison group, and are projected to earn over $400,000 more through age sixty-five.[5] The gains for graduates of community college vocational programs were far smaller—$17,000 in the short run and about $210,000 by age sixty-five. In the early post-training period, 84 percent of apprentice completers held jobs, compared to only 70 percent of community college professional/technical graduates. Of those employed, only 11 percent of apprentices reported that their program was not related to their jobs; for community college graduates, the figure jumped to 25 percent.

Another study of apprenticeship in ten U.S. states also documents large and statistically significant earnings gains from participating in apprenticeship.[6] It estimates how the length of participation in an apprenticeship affected earnings, holding constant for pre-enrollment earnings of apprenticeship participants. At six years after starting a program, earnings of the average apprenticeship participant (average duration in an apprenticeship) stood at 1.4 times the earnings of non-participants with the same pre-apprenticeship history. The gains were highly consistent across states, although the earnings advantages narrowed between the sixth and ninth years after program entry. The study looks at government administrative and oversight costs as well as the costs of government-funded classroom instruction. Costs to employers and union-management sponsors of apprenticeship are not examined. Overall, the study finds that apprenticeship returns nearly $28 in benefits for every dollar of government and worker costs. The net dollar gains projected over a worker's career amounted to about $125,000.

Studies of apprenticeship training in European countries also generally find high rates of returns to the workers, often in the range of 15 percent.[7] Clark and Fahr estimate wage gains in this range (about 6 percent to 8 percent per apprenticeship year with duration of slightly less than three years), with gains only modestly lower by shifts from the training occupation to another occupation.[8] One quasi-experimental study of the returns to apprenticeship training in small Austria firms examines the interaction between apprenticeship duration and failing firms.[9] A firm going out of business generally results in a sudden and exogenous end to the apprenticeship training in the firm. Thus, the timing of firm failure will affect the duration of apprenticeship training a particular worker experiences. By looking at apprentices who obtained training in failed firms, one can examine a large number of trained workers with varying durations in their apprenticeships. The results show that apprenticeships raise wages by about 4 percent per year of training. For a three- to four-year apprenticeship, post-apprenticeship wages end up 12 percent to 16 percent higher than they otherwise would be. Since the worker's costs of participating in an apprenticeship are often minimal, the Austrian study indicates high overall benefits relative to modest costs.

Two studies of apprenticeships in Canada reveal a high wage premium for apprenticeships for men but not for women.[10] Apprenticeship completion is the highest educational attainment for only about 7 percent of Canadian men. However, for this group, earnings are substantially higher than the earnings of those who have only completed secondary school and nearly as high as those who have completed college programs that are less than a bachelor's degree. Overall, the gains for men from apprenticeship training are in the range of 17 percent to 24 percent. Even evaluated after twenty years of experience, apprenticeship training in most occupations yields continuing returns of 12 percent to 14 percent.

Apprenticeship and Economic Mobility

The portability of the skills learned in occupation-specific programs is a common concern about apprenticeships or any occupation-specific training. How skill portability varies with the mode of learning and the curricula is unclear, *a priori*. As Geel and Gellner point out, learning even a highly specific skill can yield benefits outside the narrow occupation.[11]

All skills are general in some sense and occupation-specific skills are various mixes of skills.[12] After compiling the skills and their importance for nearly eighty occupations, Geel and Gellner estimate how skills are grouped within narrow occupations.[13] This approach recognizes that skills developed ostensibly for one occupation can be useful in other occupations. It identifies occupational clusters that possess similar skill combinations within a given cluster and different skill combinations between clusters.

The cluster approach captures the high degree of portability of German apprentices. While only 42 percent of apprentices stay in their initial occupation, nearly two-thirds remain with their apprentice occupation of or another occupation in the same skill cluster. When they do move to another occupation in the same cluster, apprentices actually increase their wages. Further, those trained in occupations with more specific skill sets are more likely to remain in their initial occupation or move to occupations within the same cluster.

Another study indicates high returns and transferability of German apprenticeship.[14] The overall rates of return to each year of apprenticeship range from 8 percent to 12 percent for training in firms of fifty workers or more, and from about 5.5 percent to 6.5 percent for firms of two to forty-nine workers. As Geel and Gellner found, the wage penalty varies with the distance away from the original occupation.[15] There is no penalty at all from displacement into a somewhat related occupation. Finally, Clark and Fahr find only 18 percent of all former apprentices stated they used few or no skills learned in their apprenticeships.[16]

In the United States, when comparing how post-secondary alternatives relate to mobility, we should recognize that community college and private, for-profit college students often take highly specific occupational courses, while all apprentices take some general, classroom courses. Thus, apprentice electricians learn the principles of science—especially those related to electricity. In most countries, collaboration takes place between vocational schools and apprenticeship programs. From this perspective, apprenticeship programs can

be viewed as "college plus" or "dual" programs that combine work-based and post-secondary courses, albeit with an emphasis on work-based learning.

Apprenticeship and Social Development

Apprenticeship is one of the few approaches that incorporate both an economic and social dimension. From an economic standpoint, apprenticeships can help resolve a skills mismatch that seems to be emerging in the United States. A good indication of this mismatch is the complaints by foreign companies operating in the United States about the skill shortfalls in key jobs; these companies have no ideological stake in misstating the notion of worker shortages. German companies operating in the United States are so concerned about finding workers with appropriate occupational skills that they have stirred the German embassy in Washington, D.C. to launch its own skills initiative, bringing together German and American companies, local chambers of commerce, colleges, and other training providers. The goal of the initiative, the embassy says, is to "identify and spread best practices in sustainable workforce development," and "spread the message about the German apprenticeship system" and its potential benefits for the U.S. economy.

At the same time, apprenticeships can yield social benefits—first by upgrading jobs and the earnings of the middle class, and second by improving social outcomes. One analysis found that technical vocational education (including apprenticeship) is linked to higher confidence and self-esteem, improved health, higher citizen participation, and higher job satisfaction.[17] These relationships hold even after controlling for income. Other studies have indicated that apprenticeships improve vocational identity.[18]

Apprenticeship training limits the gaps between what is learned at school and how to apply these and other skills at the workplace. Transmitting skills to the workplace works well with supervisory support, interactive training, coaching, opportunities to perform what was learned in training, and keeping the training relevant to jobs.[19] The benefits extend to the developmental side of young people. Robert Halpern finds that youth apprenticeship helps young people develop independence and self-confidence through their ability to perform difficult tasks. He notes, "Apprentices learn through observation, imitation, trial and error, and reiteration; in other words through force of experience."[20]

While apprentices are expected to demonstrate professionalism and care, they are not expected to be perfect. From Halpern's perspective, apprenticeships offer youth to explore new areas in a structured environment. They can try out new identities in an occupational arena and experience learning in a context of production—of making things. By mastering tasks that other young people cannot, apprentices gain a strong sense of pride that a "B student" is unlikely to feel when passing a test or even completing a paper. Apprenticeships offer a way of involving constructive adults that makes sense to young people.

A robust apprenticeship system can narrow the gender gaps in post-secondary credentials. Young men, especially minority men, have fallen far behind young women in graduating college. As of March 2013, only 24 percent of African American men and 17 percent of Hispanic men ages twenty-five to thirty-four had attained an associate's or bachelor's

degree. In contrast, associate's or bachelor's completion rates were 37 percent for African American women and 27 percent for Hispanic women. In Canada, young women also outpace young men in college completion. However, if one counts apprenticeship credentials as comparable a post-secondary degree, the gender gap in post-secondary attainment narrows sharply.

Apprenticeships can accommodate differences in learning styles that may be relevant to gender gaps. Although learning-by-doing is appealing to most students, the difference between a model based solely on classroom learning and one taking place mostly on the job may be of special importance to men. Apprenticeships give workers who are bored in school, or who worry about the value of education, increased confidence that their personal efforts and investment in skill development will pay off. Minorities may find apprenticeships especially useful in enhancing their employability skills in such areas as communication, problem solving, and teaching others.

Benefits to Firms

It is common to ask the question: if apprenticeships are such good investments, why don't more employers offer them? The evidence from England and South Carolina demonstrates the importance of information and of making apprenticeships easy to implement. Both factors played a role in stimulating employers to adopt apprenticeships. Still, the long-term success of attracting employers to use apprenticeship requires knowledge of the costs and benefits to employers.

Employer net costs depend on the mix of classroom and work-based training, occupation, skill, and wage progression, and the productivity of the apprentice while learning to master the required skill. Direct costs include apprentice wages, the wages of trainer specialists for the time they oversee apprentices, materials, and the costs of additional space required for apprenticeship.[21] The benefits depend on the extent to which apprenticeships save on subsequent hiring and training costs, lower turnover costs, and enhance productivity more than added wage costs. Also valuable is the employer's increased certainty that apprentice graduates know all relevant occupational and firm-specific skills and can work well alongside other skilled workers. In addition, having extra well-trained workers, such as apprentice graduates, provides firms with a valuable option of expanding production without reducing quality, in response to uncertain demand shocks and covering for sudden absences of skilled workers. The high level of occupational mastery achieved by apprentices may increase the pace of innovation and the ease of implementing new technologies.

One analysis examined the costs and benefits to thousands of German and Swiss firms while excluding the government-financed, school-based learning linked to apprenticeships.[22] Looking only at the training period, the authors calculate these gross costs—worker wages, trainer wages, and materials—and the benefits to employers derived from the productive contributions of apprentices during the training period. The study offers details on the wages of management and training personnel, wages of regular skilled and unskilled workers, wage costs of apprentices, time at the workplace, share of

apprentices' workplace time devoted to tasks normally undertaken by unskilled and skilled workers, and the relative productivity of apprentices compared to regular workers.

The results show firms recoup all or nearly all their investment in apprenticeships. The average gross costs per year, per apprentice amounted to 15,500 Euros for German firms and about 18,000 Euros for Swiss firms. But the value of production generated through apprentices amounted to over 19,000 Euros per year for Swiss firms and 8,000 Euro per year for German firms. Most Swiss firms, and about one-third of German firms, recouped their investment within the training period.

The reason is that apprentices ascend quickly from taking on unskilled to skilled tasks. In Switzerland, the productivity of apprentices rises from 37 percent of a skilled worker's level in year one to 75 percent in the final year; the increase in Germany is just as rapid, increasing from 30 percent to 68 percent of a skilled worker's productivity over the apprenticeship period.

An extensive study of Canadian employers sponsored by the Canadian Apprenticeship Forum estimated employer costs and benefits of four-year apprenticeships in 15 occupations.[23] For all fifteen occupations, employers earned a positive return on their apprenticeship investments during the apprenticeship period. The average benefit was 1.38 times the average cost. Any post-program benefits would add to the economic returns.

A study of the United Kingdom program examined the returns to eight employers in each of four industries—engineering, construction, retail, and business administration, including foundation and advanced levels.[24] The authors estimate that employers recouped the costs during the apprenticeship period or by the early post-apprenticeship period, when employers save on recruitment and training costs.

Savings in recruitment and training costs can be significant. One study found such savings average nearly 6,000 Euros for each skilled worker trained in an apprenticeship and taken on permanently.[25] Other benefits accrue to employers, including reduced errors in placing employees, avoiding excessive costs when the demand for skilled workers cannot be quickly filled, and performance advantages favoring internally trained workers who understand company processes over skilled workers recruited from the job market.

One benefit to firms rarely captured in studies is apprenticeship's positive impact on innovation.[26] Another is the option value of having an abundance of well-trained workers. In a world of uncertainty about levels of production and irreversible investments in particular workers, firms investing in apprenticeship training create "real options." When workers complete their training, firms have the option—but not the obligation—to hire some or all of the trained workers. Having additional well-trained, apprenticed workers with a range of skills allows firms to deal with unexpected increases in demand or losses of other experienced workers. Though hard to quantify, the value of these real options raises the firm's returns on apprenticeship investments.

In the United States, reports by firms using apprenticeships are overwhelmingly positive. A

majority of sponsors believe their programs are valuable and involve net gains.[27] Nearly all sponsors reported that the apprenticeship program helps them meet their skill demands. Other benefits of apprenticeship included reliably documenting appropriate skills, raising productivity and worker morale, and reducing safety problems.

One potential concern of employers is that the workers they train will move to other companies after completing their apprenticeship. Among U.S. firms offering apprenticeships, the overwhelming majority did not view this problem as serious—and most of those that did still reported high levels of satisfaction with apprenticeship. The evidence from other countries suggests why "poaching" is not a deterrent to offering apprenticeship.

Overall, with sufficient information about setting up and maintaining an apprenticeship program and with an effective infrastructure for apprenticeship, firms are generally able to gain a high return by participating.

Promising Programs: Youth Apprenticeships

While most apprenticeship programs operate at the post-secondary level, Georgia and Wisconsin each have developed in-depth "youth apprenticeship" programs at the high school level. In both states, students fulfill all of the academic requirements for high school graduation while engaging in an apprenticeship, and use elective courses related to the apprenticeship. The occupations range widely— from agriculture and natural resources to finance, health, human services, logistics, printing, and security. In Wisconsin, students combine 450–900 hours of work-based learning with 180–360 hours of technical instruction. In Georgia, the work-based learning component—which includes working in the summer—is two thousand hours.

Sophomore students generally learn about the possibility of joining the apprenticeship program as juniors and seniors. Apprentices complete not only their high school diploma, but also a post-secondary certificate or degree, and certification of industry-recognized competencies applicable to employment in a high-skill occupation. Mentorship is a key part of the program, as are employer evaluations of the student's job performance and the building of professional portfolios. As of 2013, nearly seven thousand students in Georgia were participating in a youth apprenticeship. The program runs in all 165 school systems in the state. About two thousand Wisconsin students take up apprenticeships.

High schools recruit and counsel students, support career-focused learning, and assist in identifying industry partners. Businesses offer apprenticeship positions, provide each apprentice with a worksite supervisor, and ensure that apprentices gain experience and expertise in all the designated skill areas. The worksite supervisors must participate in mentor orientation and training so that they can guide students through all the skill areas and serve as coaches and role models. Parents must agree to and sign an educational training agreement and provide transportation to the student. Finally, apprentices must maintain high levels of attendance and satisfactory progress in classes (both academic and career-oriented) and in the development of occupational skills at the worksite.

Employers report high levels of satisfaction with the apprentices and the apprenticeship program. In Georgia, over 95 percent say the program has been highly beneficial to the company and that they would recommend the program to other companies. Participating companies also report good quality student performance in problem-solving and communication skills. Over three in four Georgia apprentices find jobs in their career of choice.

Promising Programs: Apprenticeships as a "College Plus" Initiative for the United States

Apprenticeship can be thought of as "college plus" in the sense that students take the equivalent of at least community college courses while pursuing a rigorous program of work-based learning and serving as a productive worker. Moreover, many programs at two-year public colleges involve courses and degrees with as much occupational specificity as apprenticeships. The Obama Administration is touting initiatives to count apprenticeships for community college credit, as part of the Registered Apprenticeship Community College Network (RACC). The RACC is a national network of post-secondary institutions, employers, unions, and associations. College members agree to provide credit for a Registered Apprenticeship completion certificate as recommended by a recognized third-party evaluator. The consortium will create a national network of colleges and Registered Apprenticeship sponsors allowing apprentice graduates to accelerate completion of their postsecondary degrees at member colleges.

Bringing Apprenticeships to Scale in the United States

Extend Use of Current Postsecondary and Training Subsidies to Apprenticeship

Several post-secondary programs could be set up to subsidize at least the classroom portion of apprenticeships. Already, localities can use training vouchers from the Workforce Investment Act for apprenticeship. To encourage the use of vouchers for apprenticeship, the federal government could provide one or two more vouchers to Workforce Investment Boards for one used in an apprenticeship program. Another step is to encourage the use of Trade Adjustment Act (TAA) training subsidies to help companies sponsoring apprenticeships just as training providers receive subsidies for TAA-eligible workers enrolled in full-time training. In addition, policies could allow partial payment of TAA's extended unemployment insurance to continue for employed individuals in registered apprenticeship programs.

Allowing the use of Pell grants to pay at least for the classroom portion of a registered apprenticeship program makes perfect sense as well. Currently, a large chunk of Pell grants pays for occupationally oriented programs at community colleges and for-profit career colleges. The returns on such investments are far lower than the returns to apprenticeship. The Department of Education already can authorize experiments under the federal student aid programs, already allowing Pell grants for some students learning high-demand jobs as

part of a certificate program.[28] Extending the initiative to support related instruction (normally formal courses) in an apprenticeship could increase apprenticeship slots and reduce the amount the federal government would have to spend to support these individuals in full-time schooling.

The GI bill already provides housing benefits and subsidizes wages for veterans in apprenticeships. However, funding for colleges and university expenses is far higher than for apprenticeships. By amending the law, we could offer half the GI bill college benefits to employers hiring veterans into an apprenticeship program. However, unless the liberalized uses of Pell grants and GI bill benefits are linked with an extensive marketing campaign, the take-up by employers is likely to be limited.

Expand Youth Apprenticeship

Although these programs reach only a very small share of young people, the United States could make a good start on building apprenticeship by replicating the numbers in Georgia throughout the country. To create about 250,000 quality jobs and learning opportunities, the gross costs of such an initiative would be only about $105 million—or about $450 per calendar year, or roughly 4 percent of current school outlays per student-year. Some of these costs would be offset by reductions in teaching expenses, as some students spend more time in work-based learning and less time in high school courses. 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 social expenditures.

Career Academies are a good place to start. They are schools within high schools that have an industry or occupational focus. Over seven thousand operate in the United States, in fields ranging from health and finance to travel, construction, information technology, hospitality and tourism, health, and arts and communication. Other sectors include agriculture, transportation, manufacturing, and public service. These programs already include classroom-related instruction, and sometimes work with employers to develop internships in fields such as health, finance, travel, and construction. Compared to other high school students, Career Academy students are exposed to a wider range of experiences linked to careers, including job shadowing, internships, and career fairs—plus guidance on how to look for a job, prepare a resume, and take an interview. Work-based learning varies, but the internships that many students experience are related to the Academy's industry or occupation theme.

Evidence from an experimental study found that Career Academies induced striking gains in earnings, especially among minority young men.[29] In the period between four and eight years after applying for the academies, young men in the treatment group were earning 17 percent more than those in the control group. This represents an increase in earnings of about $3,700 per year. The percentage gains in earnings were highest for the students facing the highest risk of dropping out of school. Some observers believe that it was the work-based learning component that generated the most success in the program.

Since Career Academies already have an occupational/industry focus, adding a rigorous,

structured apprenticeship could be attractive and feasible. A serious apprenticeship both adds skills and encourages the use of skills. Crediting these skills would reduce classroom time and the associated costs. If, for example, a student spent two days per week in a paid apprenticeship, the school should be able to save at least 15 percent of the costs. Applying these funds to marketing, counseling, and oversight for youth apprenticeship should allow the academy or other school to stimulate employers to provide apprenticeship slots. Success in reaching employers will require talented, business-friendly staff who are well-trained in business issues and apprenticeship.

To implement this component, state governments should fund marketing and technical support to Career Academies to set up cooperative apprenticeships with employers, either using money from state budgets or from federal dollars. The first step should be planning grants for interested and capable Career Academies to determine who can best market and provide technical assistance to the Academies. Next, state governments should sponsor performance-based funding to units in Academies so that they receive funds for each additional apprenticeship. Private foundations should offer resources for demonstration and experimentation in creating apprenticeships within high school programs, especially Career Academies.

Designate Best Practice Occupational Standards for Apprenticeships

To simplify the development of apprenticeships for potential employers, a joint team from the Labor Department's Office of Apprenticeship (OA) and the Department of Commerce should designate one or two examples of good practice with regard to specific areas of expertise learned at work sites and subjects learned through classroom components. The OA-Commerce team should select occupational standards in consultation with selected employers who hire workers in the occupation. Once selected, the standards should be published and made readily accessible. Employers who comply with these established standards should have a quick and easy path to registration of the program. In addition, workforce professionals trying to market apprenticeships will have a model that they can sell, and that employers can adopt (and adjust as needed). Occupational standards used in other countries can serve as starting points to the OA-Commerce team and to industry groups involved in setting standards and in illustrating curricula.

The standards and certification development should link to an effort to reconcile apprenticeship standards with state licensing of occupations. Ideally, the initiative should modernize and limit licensing. But, to the extent licensing reform does not materialize, apprenticeship should become the prime route to licensure. Finally, the safe harbor or best practice standards should be available to all firms, independently of gaining approvals from other organizations, including state apprenticeship agencies.

Develop a Solid Infrastructure of Information, Peer Support, and Research

The federal government should sponsor the development of an information clearinghouse, a peer support network, and a research program on apprenticeship. The information clearinghouse should document the occupations that currently use apprenticeships—not

only in the United States, but also in other countries, along with the list of occupation skills that the apprentices master. It should include the curricula for classroom instruction as well as the skills that apprentices should learn and master at the workplace. Included in the clearinghouse should be up-to-date information on available apprenticeships and on applicants looking for apprenticeships. The development of the information hub should involve agencies within the Department of Commerce as well as the OA.

The research program should cover topics especially relevant to employers, such as the return to apprenticeship from the employer perspective and the net cost of sponsoring an apprentice after taking account of the apprentice's contribution to production. Other research should examine best practices for marketing apprenticeship, for incorporating classroom and work-based learning by sector, and for counseling potential apprentices.

Widen the Occupational Scope and Expand the Marketing of Apprenticeship

Apprenticeships cover a wide range of occupations in several countries.[30] To reach 50 percent to 70 percent of young cohorts, as the Swiss and German systems do, apprenticeships have to include service and professional jobs as well as manufacturing and construction occupations. In mature systems, apprenticeships take place in banking, engineering, commercial sales, accounting, marketing, IT, security, natural and energy resources, and hotel management, just to name a few. A broad-based apprenticeship system would mark a major change in the United States. Well over 50 percent of apprenticeships are in the construction trades; in many states, the figure is far higher. The building trade apprenticeships are generally high quality and yield high earnings upon completion. However, the very strength of apprenticeship in the building trades and in construction unions can cause government regulators to view apprenticeship in general from a construction perspective. The federal Office of Apprenticeship (OA) within the U.S. Department of Labor has worked to attract employers to use apprenticeship for occupations outside of construction. However, OA's success has been limited, partly because of very small budgets and an inability to hire flexibly.

Few states have been dynamic in seeking out sponsors in new occupations or even in recruiting more employers in existing occupations. One reason is that their budgets for undertaking these efforts are minimal. In any event, the overall result is that the decline in the absolute number of apprenticeships associated with the drop in construction has not been offset by increases in apprenticeships in other fields.

Still, a few states have made headway in stimulating employers to start apprenticeship programs. South Carolina's successful example involved collaboration between the marketing unit (branded as Apprenticeship Carolina) in the technical college system and a federal representative from the Office of Apprenticeship. Apprenticeship Carolina uses talented, business-savvy salespeople to connect with businesses and encourage them to start apprenticeships, then handles all the paperwork and moves companies through the registration process. With a state budget of $1 million per year—as well as tax credits to employers of $1,000 per year, per apprentice—the program managed to stimulate more than a six-fold increase in registered apprenticeship programs and a five-fold increase in

apprentices. Nearly all of the increase in apprenticeships took place in non-construction fields. Especially striking is that these successes—including 4,000 added apprenticeships—took place as the economy entered a deep recession and lost millions of jobs. The costs per apprentice totaled only about $1,250 per apprentice calendar year, including the costs of the tax credit.

Other approaches to marketing have worked to expand apprenticeship in England. In addition to a national branding effort by the National Apprenticeship Service, Apprenticeship Week activities, and speeches by government leaders on apprenticeship, England has devised a sales strategy for working directly with employers. The Skills Funding Agency funds Further Education (FE) colleges and private training providers (Association of Employment and Learning Providers, or AELP) to recruit employers, manage the apprenticeship process and progress, and provide the related classroom training. The private training firms now account for about 70 percent of British apprenticeships.

For apprenticeship to achieve scale in the United States, policymakers will need to supply incentives to private and public organizations to reach individual employers and demonstrate to them why apprenticeships will have value. Additional options to promote apprenticeship training include the provision of tax credits to employers for adopting registered apprenticeship and technical assistance.

The Modest Problem—Parental and Social Influences on Potential Apprentices

One common concern about expanding apprenticeship in the United States is that parents will discourage their children from taking up an opportunity outside the traditional college framework. Fortunately, this is a far more hypothetical than real problem. Today, quality apprenticeship programs have little trouble attracting sufficient numbers of applicants to fill the apprenticeship slots available. Indeed, most have waiting lists filled with competent applicants. The central problem is insufficient apprenticeship offers. In today's context, it would do no good—and in fact might harm the situation—if parents, schools, and workforce placement programs encouraged massive numbers of young people to seek apprenticeships. The constraint to expansion is on the employer demand side. As the number of positions expand, and as young people see others succeeding in apprenticeships, the stigma against apprenticeships as subpar options will erode further. At that point, the key government role is to improve job and career counseling, and to help young people think carefully about which occupation and pathway to pursue.

Future Vision

Expanding apprenticeship training in the United States can make a major difference in the lives of young workers. Instead of performing at the mediocre level (or worse), more young people can gain mastery in an interesting profession. The learning-by-doing embedded in apprenticeship will give young people confidence in their ability to learn and sometimes encourage apprentice graduates to pursue and earn a bachelor's degree. Apprenticeship is distinctive in affecting both the supply side (workers and their skills) and the demand side

(employers and the jobs they create). As employers train and see the capabilities of the apprentices, they begin to raise expectations about the types of tasks that workers in a specific job category can undertake. This step encourages employers to require and use more skill on jobs, ultimately enhancing them.

The real question is not whether expanding apprenticeship is desirable, but rather whether it is feasible. The recent growth in England, from about 150,000 apprentices in 2007 to over 800,000 today, demonstrates the feasibility of expansion, even in countries with relatively free labor markets and similar scores on international literacy and numeracy scores as the United States.

Today, the United States is still absorbed in a "college for all" mentality, which has high returns for many young people. But for others, high costs, high failure rates, and weak links with the labor market dominate. One reason for the emphasis on "college," including occupational community college programs, is the limited number of alternative, well-structured learning opportunities. Building an extensive and high-quality apprenticeship system in the United States would diversify the routes to rewarding careers and potentially save government cost—as well as avoid the frustration of many young people who do not thrive in an "academic only" approach to learning.

If the United States apprenticeship system penetrated the same share of the workforce as in Australia, Canada, and England, there would be four million apprentices (about ten times the current number). Assuming apprenticeships last two to four years (an average of three), reaching this goal would provide nearly one-third of young people with the chance to master what is required to be well paid in a medium- or high-skill career. At this scale, and with bachelor's degrees at about 35 percent—over two out of three Americans would be attaining the skills and qualifications necessary for good jobs. The improvement in the middle class would be remarkable.

No single policy can deal with high youth unemployment, low youth skills, the rise in inequality, and the decline of middle-skill jobs. But expanding apprenticeship is one of the most productive and cost-effective ways of lessening these problems.

As these policy developments emerge, expanding the research base about apprenticeship will be important. We need a better understanding of the political, economic, business, and social attitude factors that constrain or help countries develop quality apprenticeship systems. What are the best systems for marketing apprenticeship to companies? What is the role of improved information for prospective apprentices and employers? What is the tradeoff between national standards that ensure portability and company-based standards that might improve retention of workers after the apprenticeship? What is the tipping point at which there are sufficient apprenticeships—so that students see apprenticeships as viable paths to rewarding careers and employers become comfortable embracing apprenticeship in their recruitment, training, and upgrading policies? How best can apprentices smoothly transition to undergraduate and graduate university programs?

There is plenty of work to do at the policy, implementation, and research levels to use

expanded apprenticeship as a way to make a better world for young people and the workforce. It is time to get started.

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[1] In Austria, Germany, and Switzerland, apprenticeship takes place in late school. Countries also vary in terms of occupational coverage, interactions with schools and training providers, and subsidies.
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[3] Organisation for Economic Cooperation and Development (OECD), "Jobs for Youth: United States" (Paris: OECD, 2009).
[4] For a list of apprenticeships in each of ten clusters of occupations in five countries, see the occupational standards section at www.innovativeapprenticeship.org.
[5] Kevin Hollenbeck, "State Use of Workforce System Net Impact Estimates and Rates of Return," Presented at the Association for Public Policy Analysis and Management (APPAM) Conference, Los Angeles, California, 2008, http://research.upjohn.org/confpapers/1; Washington State Workforce and Education Coordinating Board, "2014 Training Results: Apprenticeship," 2014, http://wtb.wa.gov/Documents/2-Apprenticeship_2014.pdf.
[6] Debbie Reed et al., "An Effectiveness Assessment and Cost-Benefit Analysis of Registered Apprenticeship in 10 States" (Washington, D.C.: Mathematica Policy Research, 2012), http://wdr.doleta.gov/research/FullText_Documents/ETAOP_2012_10.pdf.
[7] Damon Clark and René Fahr, "The Promise of Workplace Training for Non-College-Bound Youth: Theory and Evidence from German Apprenticeship," IZA Discussion Paper No. 378 (Bonn, Germany: IZA, 2001), http://www.iza.org/en/webcontent/publications/papers/viewAbstract?dp_id=378; Josef Fersterer et al., "Returns to Apprenticeship Training in Austria: Evidence from Failed Firms," *Scandinavian Journal of Economics* 110, no. 4 (2008), 733–753; Regula Geel and Uschi Backes-Gellner, "Occupational Mobility Within and Between Skill Clusters: An Empirical Analysis Based on the Skill-Weights Approach," Working Paper No. 47, Swiss Leading House on Economics of Education, Firm Behavior, and Training Policies (Zurich, Switzerland: Swiss Federal Office for Professional Education and Technology, 2009), http://ideas.repec.org/p/iso/educat/0047.html.
[8] Damon Clark and René Fahr, "The Promise of Workplace Training for Non-College-Bound Youth: Theory and Evidence from German Apprenticeship," IZA Discussion Paper No. 378 (Bonn, Germany: IZA, 2001), http://www.iza.org/en/webcontent/publications/papers/viewAbstract?dp_id=378;
[9] Josef Fersterer et al., "Returns to Apprenticeship Training in Austria."
[10] (Boothby and Drewes 2010; Gunderson and Krashinsky 2011)
[11] Geel and Gellner, "Occupational Mobility Within and Between Skill Clusters."
[12] (Lazear 2009)
[13] Geel and Gellner, "Occupational Mobility Within and Between Skill Clusters."
[14] Clark and Fahr, "The Promise of Workplace Training for Non-College-Bound Youth."
[15] Geel and Gellner, "Occupational Mobility Within and Between Skill Clusters."
[16] Clark and Fahr, "The Promise of Workplace Training for Non-College-Bound Youth."
[17] European Centre for the Development of Vocational Training (CEDEFOP), *Vocational Education and Training is Good for You: The Social Benefit of VET for Individuals* (Luxembourg: Publications Office of the European Union, 2011).
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[21] (Wolter and Ryan 2011).
[22] (Muehlemann et al. 2010)
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[29] (Kemple and Willner 2008)
[30] For a detailed listing of apprenticeships by occupational cluster for five countries, go to the occupational standards page of the American Institute for Innovative Apprenticeship, www.innovativeapprenticeship.org.