

The State of Apprenticeship In the US: A Plan for Scale

A White Paper

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**APPRENTICESHIPS
FOR AMERICA**

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Abstract

Apprenticeships are attracting renewed interest from American policymakers, companies, public institutions, researchers, and the media. More workers, employers, and government leaders are becoming convinced that apprenticeships offer a cost-effective route to rewarding careers than community colleges, short-term training programs, and sometimes even four-year BA programs. The reasons are increasingly clear: apprentices learn primarily by doing; apprentices are productive workers and earn money while they gain expertise in a field; apprenticeships yield a return to employer investments through training in the context of the employer's organization; and scaling apprenticeship requires far less government investment than alternative career-focused programs.

This paper reviews the current state of apprenticeship in America and recommends how the US can bring apprenticeships to scale, covering 25-30% or more of an age cohort. The central recommendation is to fund organizations to persuade employers to adopt the apprenticeship model and hire apprentices. Funding would go to organizations/intermediaries, who operate between apprentices and employers, based on how many apprentices they stimulate employers to hire and train. This pay-for-performance model would work far more efficiently than the current practice of providing individual grants and contracts through the normal request for proposal system. We estimate that funding of \$4 billion per year could create an additional 1 million apprentices. The other primary recommendations are: 1) to create a public-private entity to work with public and private employers to produce occupational skill standards; and 2) to use existing funding streams backed up by additional allocations to pay for most of the off-job training in a registered apprenticeship.

Introduction

Apprenticeships are attracting renewed interest from American policymakers, companies, public institutions, researchers, and the media. States have been passing new laws to support apprenticeship, as many Governors of both political parties highlight the potential of apprenticeship. The number of bills and laws referencing apprenticeship more than doubled between 2007 and 2021.¹ For the first time since 1938, the House of Representatives passed new legislation codifying registered apprenticeship in the National Apprenticeship Act of 2021. Meanwhile, news stories about apprenticeship in the US doubled from about 1,600 in 2006-2007 to almost 3,200 in 2020-2021. Until 2015, federal funding for apprenticeship had long hovered around \$30 million per year, barely enough to support the Office of Apprenticeship and its field representatives. Then, late in the Obama Administration and continuing through the Trump Administration, federal support for apprenticeship jumped fivefold to over \$150 million per year.

What accounts for this renewed interest in apprenticeship? One reason is dissatisfaction with how today's educational system prepares people for careers. Many groups of workers have experienced wage stagnation, limited economic mobility, and shortfalls in basic and employability skills. Students entering college often fail to graduate despite accumulating mountains of student debt. Six years after starting a four-year college, 40 percent of men and 35 percent of women had not graduated.² Degree attainment at two-year colleges is even lower, especially among minorities.³ The weak outcomes are especially troubling, given that the United States spends far more per student than other advanced countries.

At the same time, U.S. employers report serious skills mismatches. One survey of a nationally representative sample of manufacturing companies found that "eighty-four percent of manufacturing executives agree there is a talent shortage in US manufacturing, and they estimate that 6 out of 10 open skilled production positions are unfilled due to the shortage"

¹ Lexis-Nexis search by author for bills mentioning apprenticeship.

² National Center for Educational Statistics, https://nces.ed.gov/programs/digest/d20/tables/dt20_326.10.asp

³ For example, only 19 percent of Black students entering two-year colleges earned an AA or BA degree six years later.

(Giffi, Dollar, Gangula, & Rodriguez, 2015). This skills shortfall in manufacturing is primarily in jobs that require occupational and employability skills and is not necessarily about a shortfall in the general skills that come with many college degrees. In fact, worker productivity depends heavily on occupational competencies and employability skills such as communication, teamwork, the ability to efficiently allocate resources, problem-solving, reliability, and responsibility. Strikingly, in hard-to-fill jobs, firms generally prefer relevant work experience over a bachelor's degree (Fuller & Raman, 2017).

Skill mismatches arise partly because policymakers inappropriately define skills as formal academic learning, measured by years of schooling, completion of degrees, or scores on tests of math and verbal capabilities. In fact, employers generally focus on employability and occupational skills. The myriad nature of skills raises questions about the near-exclusive focus by policymakers and researchers on schooling and academic test scores. So, too, does the recognition that many young people become disengaged from formal schooling, leading to weak high school outcomes (as reflected in high rates of enrollment in remedial coursework) and low college completion rates.

Given the shortcomings of an "academic only" model, policymakers are increasingly recognizing the value of alternatives, especially robust apprenticeship systems. Apprenticeship programs combine academic and structured, work-based learning under a mentor or supervisor. They allow students to earn wages and contribute to production, while working towards a valuable, occupational-based credential. Apprenticeship programs improve the learning process (as students directly apply what they learn), encourage student engagement, incentivize students to perform well in academic courses, increase the match between workers' skills and labor market demands, and widen access to rewarding careers for workers who prefer learning-by-doing over traditional classroom education and the four-year college model. It is no wonder that the share of young people neither in work nor schooling is lowest in Germany and Switzerland, two countries with high rates of apprenticeship learning.

In the US, apprenticeships have long trained electricians, pipefitters, carpenters, and other professionals in the industrial and commercial construction industry but very few others. Even within the US Department of Labor, the apprenticeship system attracted little attention.

But, since 2015 and starting with the \$175 million funding (over five years) of the American Apprenticeship Initiative, the Congress and three Presidential Administrations have supported increased allocations of about \$150-175 million per year for the registered apprenticeship system. At the same time, several states have offered financial incentives to businesses to create apprenticeship. Civilian apprenticeships have increased from about 390,000 in 2008 to about 514,000 in 2020 but the share of registered apprentices in the labor force has still only reached 0.3%, a rate far lower than in many other advanced economies. Thus, while the increased funding and attention is welcome, it is far too limited to generate apprenticeships at a scale that provides adequate career opportunities to workers and adequate skill development required by employers.

The goal of Apprenticeships for America is to help the country achieve the scale required for a robust and effective apprenticeship system. But, in doing so, we must first assess the current state of apprenticeships in the US. This white paper first examines the levels and composition of US apprenticeships, then assesses the federal government role in apprenticeship, and highlights selected state efforts to expand apprenticeship, and concludes by presenting a concrete plan for scaling US apprenticeships.

The Level and Trend in US Apprenticeships

US apprenticeships have long played a major role in training highly skilled electricians, carpenters, pipefitters, and other crafts. Yet, apprenticeships have and continue to play a minor role in preparing workers for demanding careers.⁴ In 1949, the 230,000 apprentices made up 0.37 percent of the work force. As the workforce grew from 1949-1979, the number of registered apprentices barely increased to 290,000, lowering the share of apprentices to .28%. By 2011, when the workforce reached 153 million, the apprentice share had dropped further to 0.22 percent. Over the subsequent nine years, the number and share of registered apprenticeships increased significantly. By 2019, the share of apprentices in the labor force reached 0.32 percent, still somewhat lower than the 1949 share. Moreover, despite some

⁴ The data below come from the Employment and Training Report of the President: 1978, from the data and statistics section of the Office of Apprenticeship website, and from the Bureau of Labor Statistics.

penetration in information technology and health care, apprenticeships remained dominated by construction trades. About two-thirds of apprenticeships are still in the construction industry.

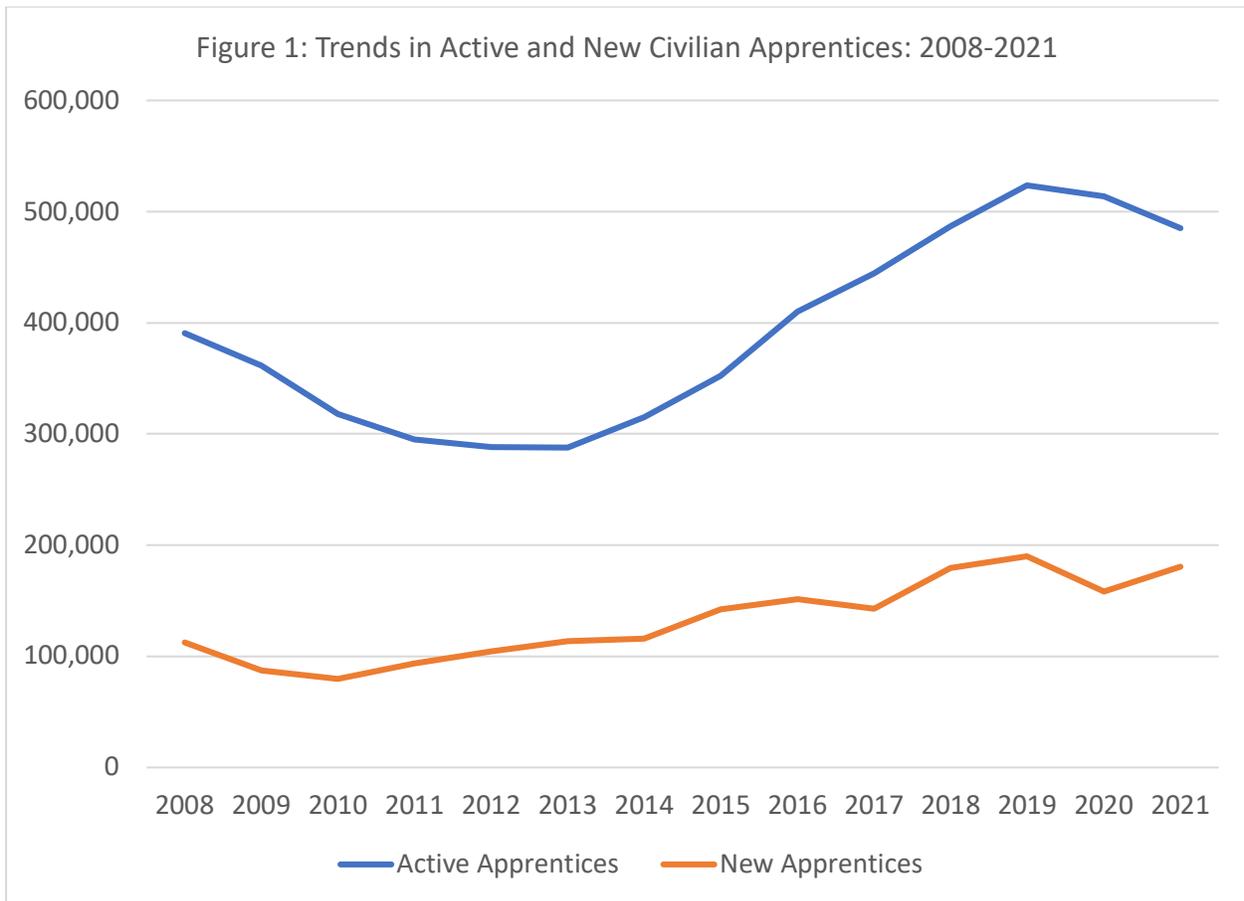
Often ignored are three other elements of apprenticeship in the US. One is the probably large but uncertain numbers of serious apprenticeships that are not registered with the federal or state apprenticeship offices. In one study, estimates drawn from the 2016 Adult Training and Education Survey (ATES) indicate that the scale of unregistered apprenticeships may be as large as unregistered apprenticeships (Jacoby and Lerman 2019). Little is known about the quality of these apprenticeships, but Jacoby and Haskins (2020) found that the FAME program (Federation for Advanced Manufacturing Education) involved considerable rigor, duration, and high post-program earnings.

A second overlooked aspect of US apprenticeship is the large military component of registered apprenticeships. As of 2020, 123,000 of the 636,000 apprenticeships were in the United States Military Apprenticeship Program (USMAP). Only a modest amount of analysis is available on the program, but one study (Lerman et al. 2015) found military apprentices were unclear about the program's value and the program had few connections to employers in the civilian labor market, where most exiting service members will go.

An important feature of the US apprenticeship system is the split responsibilities between the federal office of apprenticeship and state apprenticeship agencies (SAAs). For about half the states, the federal office delegates registration and oversight to SAAs. This approach often complicates the process by which employers register their programs and weakens coordination of apprenticeships across the country. Less noted are the impediments to data reporting and collection. For example, the published data reported by the Office of Apprenticeship capture occupational and industry data only for the non-SAA (or federal) states and only about half of all apprenticeships. Thus, the extent to which apprenticeships have penetrated non-construction occupations is unclear.

Even the changing scale of apprenticeships is hard to judge with existing data. Note that the number of apprentices in any one year depends on how many start apprenticeships and how many stay in apprenticeships in prior years. Apprentices may stay in their programs

because of their long duration or because they do not leave early. Unfortunately, the breakdown of new entrants each year is only available for federal states. Still, looking separately at entrants and active civilian apprentices is revealing. Figure 1 shows that the number of active apprentices dipped sharply between 2008 and 2010 but new apprentices were steady.⁵ Also, the graph depicts a steep increase in active apprentices after 2010 while new apprentices show a steady increase until the 2020 Covid-induced decline.



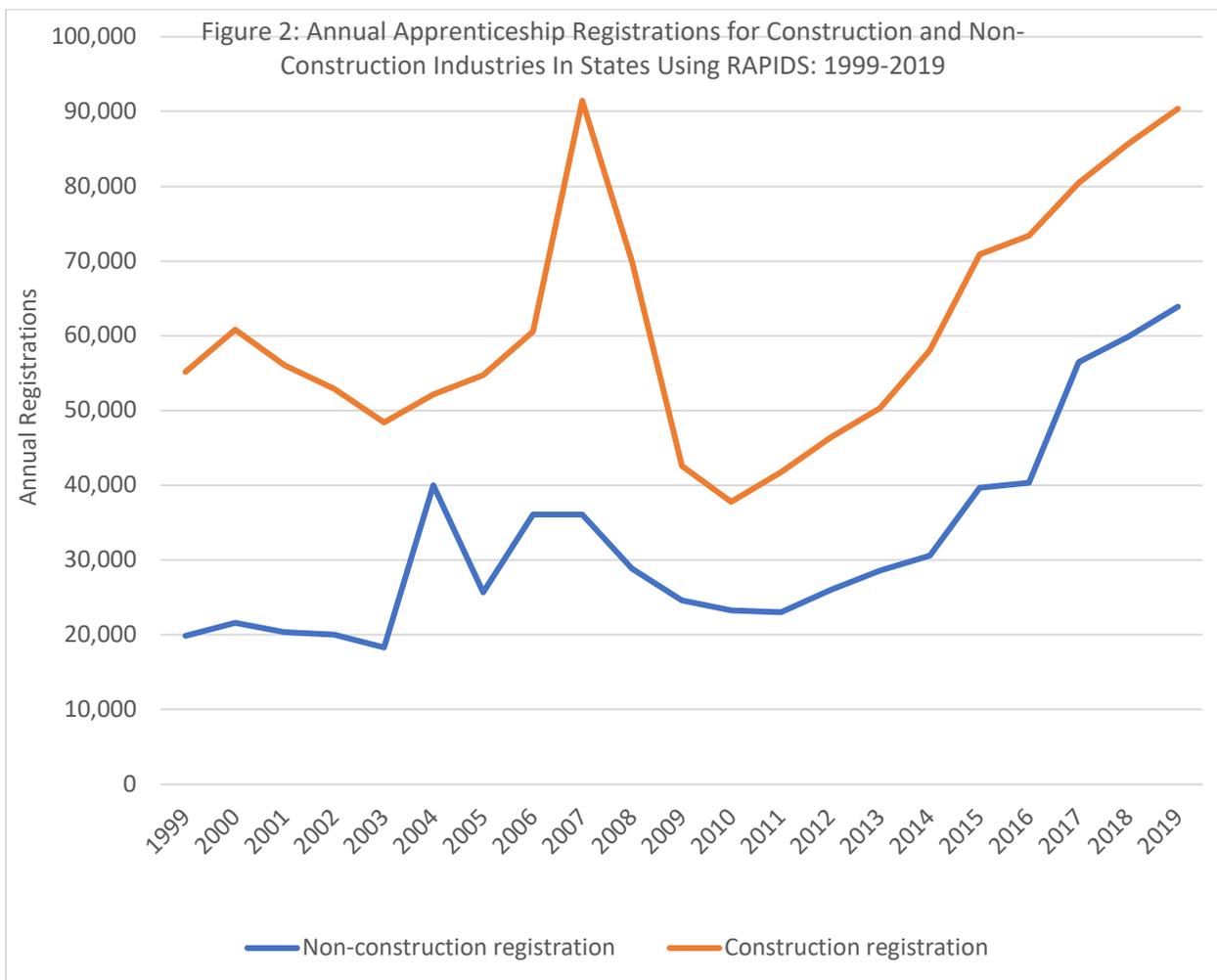
Reported data on the composition of apprenticeships by occupation is limited.

However, based on special tabulations with RAPIDS data⁶, Figure 2 shows a modest increase in

⁵ Office of Apprenticeship, Data and Statistics.

⁶ Special tabulations from RAPIDS, or the Registered Apprenticeship Partners Information Database System, which incorporates data from all the federal states and some of the SAA states.

apprenticeship starts in sectors outside construction relative to starts within construction. The huge drop in construction registrations (new apprentices) between 2007 (the peak) and 2010 (the trough) coincided with the Great Recession and the financial crisis during that period. Non-construction registrations fell by a lower amount in the 2007-2010 period. Between 1999 and 2019, new apprentices outside construction raised their share of total new apprentices from 27 to 42 percent. Because of their longer duration, the construction share of active apprentices at a point in time is higher than the construction share of new apprentices.



Recent Federal Government Initiatives

Until 2015, the federal government spent only about \$30 million per year to pay for a modest number in the Office of Apprenticeship within the Labor Department's Employment and Training Administration. Outlays authorized for apprenticeship increased from \$90 million in 2016 to \$160 million in 2019 and reached \$185 million in 2021. The funds have financed apprenticeship training providers and states through a series of individual grants. Among the grants have been \$175 million over five years to 45 grantees as part of the American Apprenticeship Initiative, \$20 million over four years to 10 industry associations and other industry intermediaries, \$184 million to 23 grantees for the Scaling Apprenticeship through Sector-Based Strategies grant program, over \$80 million to grantees to promote youth apprenticeship, and over \$280 million to state apprenticeship offices. Using its discretion over money paid by employers under the H1-B temporary visa program, the Department of Labor awarded \$99 million to 28 grantees for apprenticeships to "Closing the Skill Gap".

Grants under the Apprenticeship Expansion and Modernization Fund paid for initiatives to increase apprenticeships in tech occupations and for youth without connections to school or jobs, and to improve the data and occupational coverage under the United States Military Apprenticeship Program (USMAP). Another grant provided the American Association of Community Colleges (AACC) with \$20 million to create at least 16,000 apprenticeships. Awards in FY2021 included \$31 million for the creation of four Centers of Excellence (for occupational standards, equity and inclusion, partnerships, and data enhancements. States received an additional \$99 million to promote recruitment of a diverse workforce.

The large number of grants increased the number of organizations helping employers create apprenticeships. Since many of the grants and evaluations are ongoing, the results are not clear. The grant funding certainly represents an enhanced engagement in apprenticeship by the federal government and a genuine effort to widen the scope of apprenticeships beyond their base in the industrial and commercial construction industries. Although new and more diverse civilian apprenticeships have reached new highs in recent years despite the Covid-19 pandemic, the number of active apprenticeships slowed in 2020 and 2021 and the number of completed apprenticeships remain about 35-45 percent of prior apprenticeship starts.

Overall, the added interest and funding in apprenticeship has expanded the infrastructure for apprenticeship but has not been enough to stimulate the scale witnessed in countries with similar market-oriented labor markets. For example, while active apprenticeships from 2014-2016 to 2019-2021 in the US increased by 40 percent, England apprenticeships jumped five-fold to reach the scale and occupational diversity of the most robust apprenticeship systems. Canada’s apprenticeships account for about 2 percent of its workforce and 16 percent of those in postsecondary education. Were the US to achieve this scale, US apprenticeships would reach 3.2 million, or 6.5-times existing levels of civilian apprenticeships. The Canadian and British governments invest the equivalent of billions of dollars to support apprenticeship. The annual Canadian outlay of \$1 billion would translate into about \$8 billion in the US, adjusting for differences in each country’s workforce.

Apart from the modest federal investment in US apprenticeships, several structural issues limit the scope of the US registered apprenticeship system. First, until recently, employers received no government contribution for their apprenticeship investments. Even now, subsidies are modest and highly variable. Second, the registration process is bifurcated, complex, and slow, especially when employers or other sponsors apply to State Apprenticeship Agencies (SAAs). Third, a variety of requirements, such as the ratio of “journeypersons” to apprentices, make apprenticeships less than welcoming to employers. Fourth, some licensing requirements, such as for medical assistants, end up limiting the ability of workers to enter jobs and careers through apprenticeship. Finally, the US has lacked the network of organizations that are effective at persuading employers to adopt the apprenticeship model and help them implement programs.

The Role of States

States vary widely in terms of their support for scaling apprenticeship and for their apprenticeship penetration of the workforce. But in recent years, increasing numbers of states have offered funding and tax credits for employers who hire apprentices. Federal grants to states have played a role in strengthening state apprenticeship offices and initiatives.

The rates of apprentices relative to the labor force vary widely, from .001 in Oklahoma and Florida to .01 in Hawaii and .006 in West Virginia. But no state comes close to the approximately 2 percent level reached or exceeded by Australia, Canada, and England. The District of Columbia is close at 1.7 percent but might benefit from the metropolitan area construction. The average for the country is .003, or 0.3 percent.

In states with SAAs, an employer or a group sponsor often faces obstacles or delays in the registration process. Meetings to approve registrations are in some cases held only on a quarterly basis. A few SAAs in large states have particularly low apprenticeship numbers relative to their workforce; for example, Florida (.0011), Louisiana (.0017), and New York (.0018) are all well below the national average. For all states, one finds little difference in the average apprenticeship share of the workforce between SAAs and federal states. However, when weighted by population, SAAs have lower apprenticeship penetration.

The increases in each state required for the country to reach a 2 percent target vary most by the size of the state. While California has an above average apprenticeship penetration rate and the largest number of apprentices, it would require an increase of almost 300,000 apprentices to reach the 2 percent target. Texas and New York, both below average compared to other states, would have to stimulate 262,000 and 173,000 more apprenticeships.

Many states have offered their own incentives to employers for each registered apprentice. Some examples include:

Iowa provides \$1 million in state funds for Registered Apprenticeship programs (RAPs) in high demand occupations. Businesses with fewer than 20 apprentices may receive \$25,000 to start apprenticeship programs. Additionally, IA provides \$3 million in state funding for all RAP programs.

Maryland offers an Employer Incentive Plan to start registered apprenticeship programs, including a 50-75% apprentice wage reimbursement. In Baltimore, the Mayor's Office will provide employers with \$2,500 per apprentice to pay for apprenticeship supports. In addition, the MD Department of Labor will provide up to \$4,000 per employer. MD also offers \$1,000 tax credit for each eligible Registered Apprentice.

SC offers a \$1,000 tax credit per apprentice per year. The Technical College System of South Carolina provides instruction for most state apprenticeship programs.

Illinois provides a non-refundable credit against Illinois income tax for 100% of the qualified education expenses of a qualifying apprentice. The credit allowed is up to \$3,500, per apprentice per tax year, for tuition, book fees, and lab fees at the school or community college in which the apprentice is enrolled.

Massachusetts offers a Registered Apprentice Tax Credit (RATC) for expanding apprenticeships into healthcare, technology, and manufacturing sectors. Employers in these sectors may apply for tax credits of up to \$4,800 or 50% of wages paid.

Florida exempts registered apprentices from the payment of tuition and fees, including lab fees, at a school district that provides workforce education programs, Florida College System institutions, or state university.

While five of these six states achieved increases in apprenticeships between 2016 and 2021, the gains come from a very low base. Moreover, apprentices in these states are still only about .003 or .3 percent of the work force.

Evidence suggests that employer incentives alone without a sustained effort by an intermediary or other organization to sell employers on apprenticeship and help them organize programs is unlikely to generate scale. Apprenticeship consultants from South Carolina's Apprenticeship Carolina program reported that, while state tax credits helped open the employer's door, persuading them to start an apprenticeship required intensive one-on-one discussions with decision-makers. Dispelling concerns over the paperwork and other requirements was viewed as an important part of the process.

A Plan for Scaling US Apprenticeships

How can the U.S. best build a scaled, robust registered apprenticeship system? Funding is necessary but how much? Creating a viable structure is necessary but how?

A long-run strategy for the system would embody the following 10 components:

1. Effective branding and broad marketing
2. Incentives for selling and organizing apprenticeships to private and public employers
3. Programs to develop credible occupational standards with continuing research
4. Endpoint assessments of apprentices and programs
5. Certification body to issue credentials

6. Making apprenticeships easy for employers to create and to track progress
7. Funding for quality instruction in off-job classes
8. Counseling, screening prospective apprentices to ensure they are well-prepared
9. Training the trainers for apprenticeship
10. Research, evaluation, and dissemination

A strategy to implement these components can and probably must be undertaken incrementally. What, then, are the top priorities? How do the costs vary across components? The three components that can quickly yield substantial numbers of apprenticeships and move the system toward scale are:

1. *Incentives for Selling and Organizing Apprenticeships.*

Britain's success in expanding apprenticeships offers one example of how to create successful national and decentralized marketing initiatives. Alongside various national efforts, including the National Apprenticeship Service and industry skill sector councils, the British government provides funding to private training organizations and to colleges of further education for the off-job instruction in apprenticeships. These funds have been sufficient to encourage these organizations to sell and organize apprenticeships with employers. Recent Covid-related incentives offered in Australia and the UK have proved highly successful.

The success of South Carolina's Apprenticeship Carolina is another illustration of the in-depth selling and organizing approach. The expansion of apprenticeship has involved reaching out across broad industry sectors, including advanced manufacturing, health care, and information technology. Apprenticeship marketing often takes place in the context of state and local economic development efforts to attract new businesses.

Other U.S. intermediaries have also proved successful in stimulating apprenticeships. Even in the absence of incentive-based funding, the cost-effective grantees participating in the American Apprenticeship Initiative managed to increase apprenticeships at a cost of under \$4,000 per apprentice. Were the federal government to pay only for performance, linked to new apprenticeships and new apprenticeship programs, a \$4 billion investment would yield 1

million new apprenticeships. Structuring the payments to reward continuation and completion would make sense.

2. *Building and Sustaining Credible Occupational Standards*

Nearly all countries with robust apprenticeship systems create occupational frameworks for apprenticeship that all employers training in the relevant occupation mainly follow, with modest additions relating to their own organization. The current US “registered apprenticeship” system is unique in requiring individual companies or other sponsors (such as unions) that wish to register their programs to supply their own skill frameworks and curriculum. In half the states, the approval process is subject to the preferences of state agencies that are often highly restrictive and that require excessive numbers of journeypersons/mentors for each apprentice. Currently, the registered apprenticeship system leads to skill frameworks that are often uneven and highly variable.

Countries vary in their approaches, but all rely on the cooperation of the public and private sectors. England’s Institute for Apprenticeship and Technical Education oversees skill frameworks initially created by leading employers using the occupation. In Switzerland, the Federal Office for Professional Education and Technology, together with cantons, employers, trade associations, and unions, participates in framing the occupational standards for about 250 occupations (Hoeckel, Field, and Grubb 2009). The canton vocational education programs implement and supervise the vocational schools, career guidance, and inspection of participating companies and industry training centers. Professional organizations develop qualifications and exams and help develop apprenticeship places. Occupational standards in Germany are determined primarily by the “social partners,” including government, employer, and employee representatives (Hoeckel and Schwartz 2009). The chambers of commerce advise participating companies, register apprenticeship contracts, examine the suitability of training firms and trainers, and set up and grade final exams.

With funding from the US Department of Labor, the Urban Institute has been publishing competency-based occupational frameworks for apprenticeships in several occupations.⁷ In

⁷See <https://innovativeapprenticeship.org/us-apprenticeships/> for examples.

2021, added funding from the Office of Apprenticeship allowed Urban Institute to create the Registered Apprenticeship Occupations and Standards Center of Excellence. Competency-based standards in a wide variety of occupations that are vetted by the Department of Labor could complement the efforts of intermediaries to stimulate apprenticeships.

To promote these efforts on a permanent basis, the Congress could fund a public-private body to create, oversee, and assess occupational standards and ultimately the performance of apprentices.

3. Funding for Off-Job Classes Related to the Apprenticeships

One can make a strong theoretical and practical case for public or individual funding of the off-job learning (officially called related training and instruction, or RTI) in an apprenticeship. The skills learned in the off-job courses are general in that the worker's added productivity can be applied not only to the current employer but to other employers. The worker gains the benefit, but the government shares the worker's gain in the form of higher taxes and reduced transfers. On the practical side, the government already funds a significant share of the costs of courses aimed at teaching occupational skills but does so in a way that is far less cost efficient than apprenticeship. Moreover, the government reaps savings from this approach, since every apprenticeship slot stimulated by an already funded college or training organization increases the work-based component of training borne by the employer and reduces the classroom-based component often borne by government.

Some government funding already is available for the RTI in apprenticeships. One good source is existing high school-based career and technical education (CTE) programs. Since high school CTE course are already financed as an entitlement, the funds to complement work-based learning in apprenticeships would be readily available. As noted above, some states offer free or reduced tuition in community college courses for apprenticeships. Another potential source is Pell Grants used for postsecondary education to pay for the classroom portion of a registered apprenticeship program. 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 GI Bill already provides housing benefits and subsidizes wages for exiting service members who enter apprenticeships.

The Federal government should ensure that funds are available for the RTI of all registered apprenticeships. It could offer to offset employer or individual costs of related courses not covered through other sources. Developing the specifics of this strategy will be one task of the research component of the Apprenticeships for America organization.

Adding Other Elements for a Robust US Apprenticeship System

In addition to high priority components 1-3, the US should incorporate other elements to assure success for employers, apprentices, and the public. They include branding and broad marketing, endpoint assessments of apprentices and programs, counseling, screening prospective apprentices to ensure they are well-prepared, training the trainers for apprenticeship, and research, evaluation, and dissemination. These components can be implemented over time, but the highest priority is for the intermediary funding, occupational standards, and off-job funding to achieve high levels of apprenticeship offers by employers.

Reaping the Benefits of a Robust Apprenticeship System

Expanding apprenticeship is a potential game-changer for improving the lives of millions of Americans and preventing further erosion of the middle class. Apprenticeships widen routes to rewarding careers by upgrading skills, including occupational skills but also math, reading, and employability skills. Taking math, reading, and writing in the context of using these competencies in the workforce will increase the motivation of many workers and the efficacy of the delivery process. Given the ability of workers to learn more, remain well motivated, and notice how to make innovations at the workplace, firms will have an increased incentive to adopt “high road” strategies and make them work. Such an approach may be one of the only ways the firm can attract and sustain workers.

It is past time for federal and state governments to make a genuine effort to build an extensive and high-value apprenticeship system. With such an effort, US employers will follow their counterparts in other countries, create a significant number of apprenticeship slots, and realize gains in recruitment, workforce quality, and improved productivity. Institutional change of this magnitude is difficult and will take time but will be worthwhile in increasing earnings of

workers in middle-skill jobs, widening access to rewarding careers, raising national productivity, enhancing occupational identity, increasing job satisfaction, and expanding the middle class.

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