62

AICGS POLICY REPORT

BUILDING A ROBUST U.S. WORK-BASED EDUCATION AND APPRENTICESHIP SYSTEM AT SCALE: CAN LESSONS FROM EUROPE HELP?

Robert I. Lerman
Volker Rein

AMERICAN INSTITUTE FOR CONTEMPORARY GERMAN STUDIES THE JOHNS HOPKINS UNIVERSITY

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German Studies

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TABLE OF CONTENTS

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FOREWORD

High youth unemployment in the United States and Europe is a result not only of sluggish growth, but also a skills mismatch—the new generation of workers lacks the skills that employers need. Economists now predict a looming shortfall of 3 million skilled U.S. workers by 2018. Meanwhile, there are 2 million job vacancies across the European Union, despite high levels of unemployment. In response, the U.S. government and the European Union have both sought to expand career and technical education (CTE) opportunities in key industries, like the European Union's Copenhagen Process and President Obama's initiatives to build a "middle-skill" workforce and renew American manufacturing through the Advanced Manufacturing Partnership 2.0.

Previous scholarship on apprenticeships has been limited due to the difficulties of comparing the German system of education and other European systems with that of the United States. The AICGS Project on Employment, Education, and Training, of which this Policy Report is a part, provides a unique assessment of European and American approaches to developing the skills of the future workforce, pointing out strengths and shortcomings on both sides of the Atlantic and offering practical suggestions to policymakers, businesses, and educators engaged in enhancing tomorrow's work force

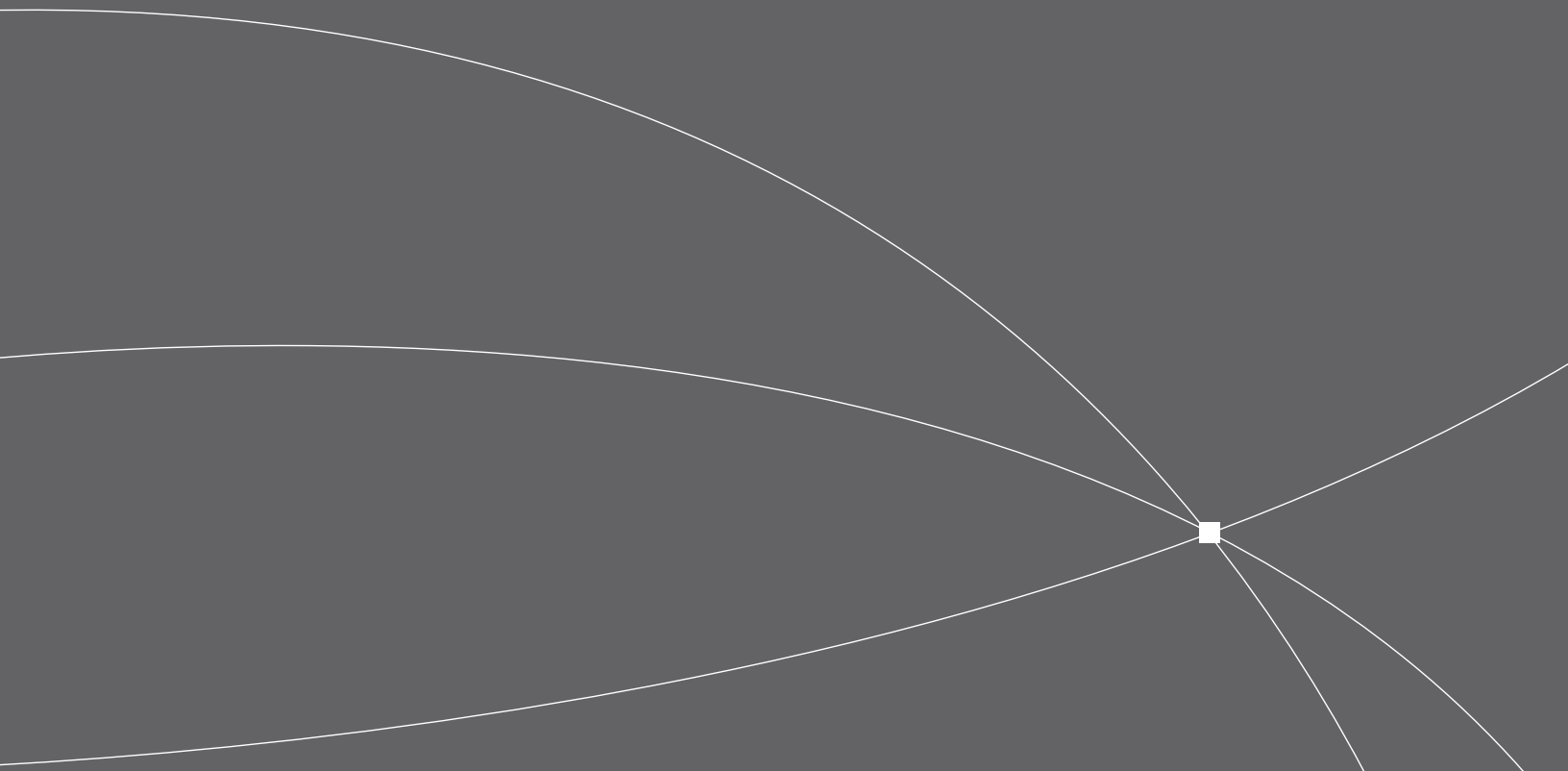
This publication is an example of AICGS' commitment to expanding the German-American dialogue to the state and local levels and increasing awareness in the United States of EU member states' long experience in the area of workforce development. AICGS is grateful to the authors for sharing their expertise, to the Robert Bosch Stiftung for its generous support of this Policy Report, to Parke Nicholson and Kimberly Hauge for their thoughtful contributions to and execution of the project, and to Jessica Riester Hart for her editorial efforts.

Jackson Janes
President, AICGS

ABOUT THE AUTHORS

Dr. Robert I. Lerman is an Institute Fellow at the Urban Institute, Professor of Economics at American University, and a Research Fellow at IZA in Bonn, Germany. A leading expert on apprenticeship, Dr. Lerman recently established the American Institute for Innovative Apprenticeship. His published research covers employment issues, inequality, family structure, income support, and youth development, especially as they affect low-income populations. In the 1970s, he worked as staff economist for both the Congressional Joint Economic Committee and the U.S. Department of Labor. Dr. Lerman was one of the first scholars to examine the patterns and economic determinants of unwed fatherhood and to propose a youth apprenticeship strategy in the U.S. He served on the National Academy of Sciences panel on the U.S. post-secondary education and training system and recently on the Maryland Task Force on Economic Development and Apprenticeship. Among Dr. Lerman's recent publications are "Expanding Apprenticeship in the United States: Barriers and Opportunities" (in *Contemporary Apprenticeship*, Routledge 2012), "Are employability skills learned in U.S. youth education and training programs?" (I*ZA Journal of Labor Policy* 2013), "Expanding Apprenticeship Opportunities in the United States" (Brookings Institution 2014), and articles on marriage and men's earnings. Dr. Lerman earned his A.B. at Brandeis University and his PhD in Economics at MIT.

Dr. Volker Rein is a social scientist specialized on developments in education and training systems and policy as well as on skills requirements in Germany, Europe, and the U.S. He is working as a senior research associate and as an advisor in the Department of Professional Learning and Teaching at the Federal Institute for Vocational Education and Training (BIBB) in Bonn, Germany. He has long-term experience in research and development work on competence-oriented qualification standards and qualification transparency instruments in Germany and the European Union since 1999. He was involved in the implementation of the Bologna Framework (EHEA) at the University level and in the development of the European and the German Qualifications Frameworks for Lifelong Learning (since 2004). His research focus is on the compatibility potential between VET and Higher Education in terms of competence and proficiency. He carried out research on competence intersections between advanced VET Programs and Higher Education in Germany (2013-2015) and on Short Higher Education (Associate Degrees) in the US and the European Union as a research fellow of the Center on Education and the Workforce at the Georgetown University in Washington, DC, in 2010-2011. From 2004 to 2010 he coordinated the cooperation between the BIBB, the American Association of Community Colleges (AACC), and the U.S. Department of Education on work-based learning and lifelong learning. He holds a PhD and an MA in Social Sciences (Social Anthropology and Communication Science, Free University of Berlin).



EXECUTIVE SUMMARY

The combination of youth joblessness, weak wage growth, and shortages of well-trained workers in key occupational areas is limiting the economic progress of Americans. The nature of the problem is highly contested, but some prominent analysts see these chronic problems as part of a "new normal" with low economic growth and high economic inequality. Rarely, however, do analysts ask whether other countries have avoided at least some of these problems. Among the countries with success in maintaining high levels of employment, education and training, wage growth, and robust manufacturing sectors are Austria, Germany, and Switzerland. One well-recognized advantage of these countries is a high quality career and technical education system that emphasizes work-based learning through apprenticeships. England is a recent convert to the apprenticeship approach, more than doubling the number of apprenticeships, many of whom work in jobs that have in the past required at least a Bachelor's degree.

National commissions have highlighted problems with the U.S. school-to-career transitions for decades. Despite federal legislation and some state initiatives, the weaknesses of the transition process have remained, youth joblessness has worsened, and wages for workers with low or moderate levels of education have stagnated.

Meanwhile, many U.S. companies are reporting great difficulty finding workers in certain occupations. A 2014 report by Accenture argues that skill shortages are threatening the growth of U.S. manufacturing. While some economists argue that skill shortages are minimal, the concerns expressed by German firms operating in the U.S. add credence to the claims of shortages in certain occupations.

International organizations buttress the claim that a robust work-based education and training system using apprenticeships can lessen the problems of high youth unemployment, low wages and productivity, skill mismatches, and economic mobility. While a consensus is emerging that expanded apprenticeship is desirable, many question whether such expansions are feasible in the highly competitive U.S. market. Leadership will be necessary first to spread the word that academic skills are necessary but not sufficient, occupational and employability skills are vital, skills can often be learned best in the context of practice, and work places can be a cost-effective setting for learning.

In undertaking any expansion of apprenticeship in the U.S., it makes sense to learn from countries that use apprenticeship effectively as a mainstream path available to late secondary and early postsecondary students. After reviewing in detail the apprenticeship approaches operating in Germany, Switzerland, and England, this Policy Report draws several lessons for how the U.S. can build a robust apprenticeship system in the U.S.

The European experiences indicate the need to ask whether apprenticeship focuses on youth or adults, how to develop stackable apprenticeship programs being part of seamless career pathways, what government financial support is appropriate, how best to stimulate employers to offer apprenticeships, how best to create and maintain skill standards, and how public policies can encourage firms to offer apprenticeships.

Existing U.S. apprenticeships largely reach adults in their mid-20s, while the most successful European models mainly cover youth in their late teen years.

The English approach involves giving preference to the youth side of apprenticeship while not excluding adults in many age groups. From a U.S. perspective, encouraging all types of apprenticeships, using a bottom-up approach, makes sense. States could be offered incentives to replicate existing initiatives in Georgia and Wisconsin. Another option is to encourage youth apprenticeship demonstrations with Career Academies and regional vocational education schools, schools where youth already have an industry or occupational major.

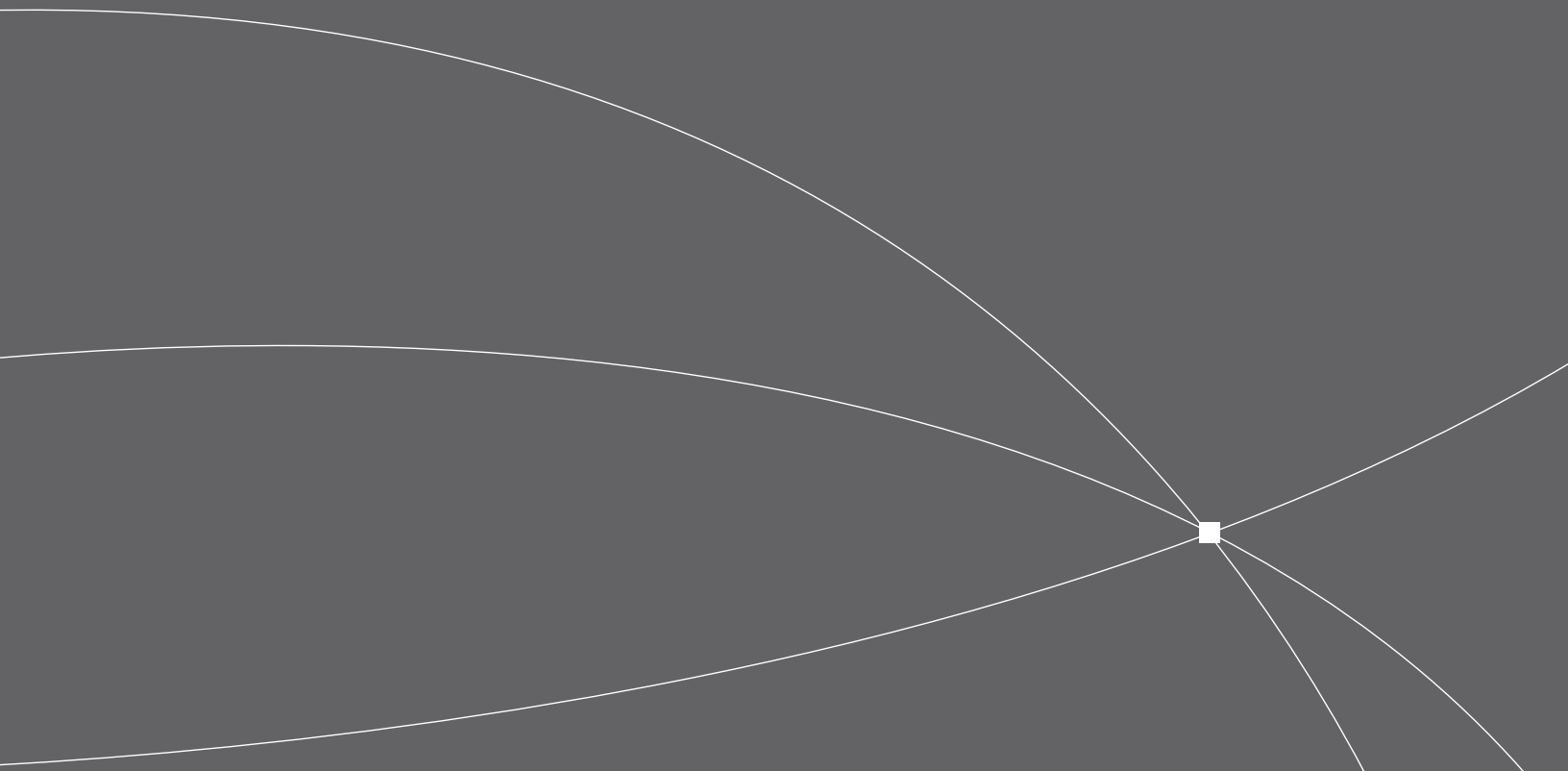
Most apprenticeship programs in Europe and elsewhere pay all or most of the costs of the training outside the workplace, typically classroom instruction. Under a youth apprenticeship approach similar to what operates in Germany and Switzerland, the public sector within the U.S. could pay for off-job classes as part of the educational system's universal funding for all high school students. Emulating England would involve financing training through private training providers and community colleges based on the age of the apprentices.

Helping apprentice completers transition smoothly to higher education is increasingly stressed in European countries. The Swiss system offers the most compelling structure for smoothing transitions from apprenticeship to university programs.

In any initiative, marketing will be critical. Jumpstarting a major expansion will require attracting large numbers of employers. England offers a good example for engagement. Alongside the National Apprenticeship Service and industry skill sector councils, the British government provided incentives to local training organizations to persuade employers to create apprenticeships. A successful effort will need a staff with marketing dynamism, sales talent, and passion for expanding apprenticeship. Pay for performance is recommended: technical education and training organizations would earn revenue only for additional apprenticeships that each college or organization managed to develop with employers.

Finally, the European experience demonstrates the importance of information, research, and development. The U.S. government should sponsor an information clearinghouse, a technical assistance component, 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 U.S., but also in other countries along with the list of occupation skills that the apprentices master. The research program should analyze the quality of skill standards used to guide training. It should assure that mastering the standards will prepare apprentices for a rewarding career and that the topics are relevant to employers. Research should cover the returns to apprenticeship from the employer perspective and best practices for marketing apprenticeship, for incorporating classroom and work-based learning by sector, and for counseling potential apprentices.

U.S. policymakers and employers are beginning to recognize the desirability and feasibility of apprenticeship. Now, what is required is leadership at the policy and program levels and effective implementation to begin to scale up apprenticeships at both the youth and adult levels. Institutional change of this magnitude is difficult and will take time. But building a robust apprenticeship system offers the country an opportunity to increase earnings by raising the productivity of workers, enhancing occupation identity as well as career and job satisfaction, and expanding the middle class.



INTRODUCTION

The transitions of American youth from school to careers have proved problematic for decades. In 1979, the National Commission for Employment Policy viewed the weak employment outcomes of disadvantaged youth as resulting from the economy's limited ability to generate jobs, educational handicaps, and discrimination and leading to declining interest in schooling. It called for targeted jobs programs and renewed efforts to remedy educational deficiencies. By 1990, two reports (by the William T. Grant Foundation and the Commission on the Skills of the American Workforce) moved the conversation toward systemic weaknesses that limit the career opportunities for at least half of all American youth.[1] These and other reports called for improving the nation's approach to the transition from school to careers. Despite federal legislation and some state initiatives, the weaknesses of the transition process have remained and youth joblessness has worsened. As Andrew Sum and colleagues recently argued, "Employment prospects for teens and young adults in the nation's 100 largest metropolitan areas plummeted between 2000 and 2011. On a number of measures—employment rates, labor force underutilization, unemployment, and year-round joblessness—teens and young adults fared poorly, and sometimes disastrously."[2]

Since the mid-1960s, the federal government has funded several programs to improve career outcomes for disadvantaged youth and all non-college youth, but most have achieved limited success. A study of Job Training Partnership Act youth programs found that they yielded no real gains.[3] An evaluation of Job Corps, a residential education vocational training program for youth ages 16 to 24, found that the program raised earnings of older youth but the gains dissipated for most youth.[4] Summer youth employment programs, funded at varying scales in cities across the country, offer only temporary assistance with limited long-term benefits.

These career training programs represent a fraction of state and federal government efforts at raising skills. Most funding goes to increase skills, mobility, and earnings almost entirely through an "academic-only" strategy. Unfortunately, the results of these efforts are uneven at best. Although the vast majority of high school graduates attend college, only about 45 percent of American workers ages twenty-five to thirty-four achieve an Associate's or Bachelor's degree.[5] Recently, President Barack Obama called for making tuition free in order to expand community college enrollments beyond the nearly 7 million students they already serve. Such an approach is unlikely to succeed for many young people, especially those lacking a high school diploma or GED and have little access to federal grant funds and the academic skills required for college success. Moreover, even among those able to enter community colleges, only about 20 percent graduate within one-and-a-half times the normal period. Finally, although tuition is low at community college, federal, state, and local governments spend about $11,400 per year at public two-year colleges.[6]

How can public policy initiatives for American youth do better? What does the experience from other countries and selected programs in the U.S. suggest about productivity enhancing ways of preparing youth for rewarding careers? A consensus is emerging, one highlighted by international organizations, that a robust work-based education and training system using apprenticeships should be expanded substantially to deal with high youth unemployment, low wages and productivity, skill mismatches, and

economic mobility. As the Organization for Economic Cooperation and Development (OECD) points out,

Work experience is also found to positively affect wages early on as well as generic skills. Nevertheless, in several countries, few youth appear to combine work and study, and most students who work do so outside such formal programs as vocational education and training (VET) courses or apprenticeships. This suggests that, in order to familiarize students more closely with the labor market, not only should work-based modules in VET and apprenticeship schemes be introduced or expanded, but measures that make it generally easier for students to gain work experience should be strengthened.[7]

Are such steps feasible in the U.S.? Yes, but only if policymakers recognize that

- Academic skills are necessary but not sufficient,
- Occupational and employability skills are vital,
- Skills can often be learned best in the context of practice, and
- Work places can be a cost-effective setting for learning.

Existing apprenticeship systems embody these elements and can serve as useful examples of how to do better in preparing American youth for rewarding careers. Apprenticeships offer a model for mastering and certifying occupational skills through a combined program of work-based learning and related classroom or academic instruction. Under apprenticeship programs, individuals undertake productive work for their employer, 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. Apprenticeship helps workers to master not only relevant occupational skills, but also other work-related skills, including communication, problem-solving, allocating resources, and dealing with supervisors and a diverse set of co-workers. The course work 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.

This Policy Report examines lessons from Europe about how best to build a robust apprenticeship system in the U.S. We begin by taking a brief look at the economic context in the U.S. and the thrust of the U.S. education and training system. What follows is an overview of alternative approaches to skill development and preparation for careers. Next, we examine in some depth current practice and emerging patterns in European vocational education and training (VET). The final sections consider how the U.S. can draw on lessons from the European experience in developing systems that reduce youth unemployment, lessen skill mismatches between jobs and workers, and expand pathways into rewarding careers.

ECONOMIC CONTEXT AND ECONOMIC CONCERNS FACING MANY COUNTRIES

Modest economic growth and moderate unemployment rates have returned to the United States, after years of struggle during the financial crisis and the Great Recession. The unemployment rate has declined to 5.5 percent in mid-2015, after reaching a high of 10 percent in October 2009. Yet, like many countries, the U.S. faces difficult economic challenges, especially with respect to the job market. The employed share of the adult U.S. population remains well below pre-recession levels. Joblessness among youth, especially minority youth, is especially severe. Among black males, only one in six 16-19 year-olds and one in two 20-24 year-old black males hold jobs.

Youth unemployment is widespread in Europe as well. Among 15-24 year-olds, the average unemployment rate across the twenty-eight European Union (EU) countries stood at over 21 percent (February 2015). However, the average does not capture the wide variation across countries, with youth unemployment rates reaching well over 40 percent in Greece, Italy, and Spain; 21-25 percent in Finland, France, and Sweden; but only about 10 percent or less in Austria, Germany, and Denmark. High rates of youth joblessness negatively affect adult outcomes in the labor market[8] and weaken the formation of healthy families. A recent European Union report sees youth unemployment as posing a serious threat to social cohesion and political stability, resulting in a lost generation. For African-American young men, the problems are particularly severe, from dropping out of high school and high rates of joblessness to engagement with the criminal justice system and having criminal records that make them even less employable. Their rates of unwed fatherhood rise during this period of the life cycle, subsequently triggering high child support obligations that sometimes make conventional employment untenable.

Wage stagnation and wage inequality add to the concerns about the functioning of job markets. In the U.S., wages have stagnated for middle class workers and have declined for the least educated. David Autor finds that jobs in middle-skill occupations are declining rapidly relative to high- and low-skill positions.[9] One of the main reasons is the increased power of computers to automate routine tasks that many middle-skill positions have long undertaken. Expanding international trade, declining unionization, and the erosion of the minimum wage are other factors that Autor sees leading to the "hollowing out" phenomenon. Moreover, similar trends are apparently occurring in other countries. Autor cites a recent paper by Maarten Goos, Alan Manning, and Anna Salomons that finds middle-wage occupations declining as a share of employment in all sixteen countries they studied.[10] However, most of the decline was offset by a rising share of high wage occupations.

Although slow growth in demand is responsible for much of wage stagnation and high unemployment, skills of youth workers are too often weak or mismatched to the available jobs. Scores on international tests show U.S. students performing well below average in reading and math literacy. Years of schooling and degree completion have increased in the U.S. but these gains have not led to a high-skill work force. Meanwhile, the costs of education, especially postsecondary education, have increased dramatically. Increasing education can in principle enhance skills, reduce unemployment, and lead to higher education. However, mismatches between what is learned in school and what employers demand are widespread. One measure of the mismatch reported for all OECD countries indicates that over 30 percent of youth with jobs are

mismatched with their field of study.

The scale of mismatch in the U.S. is hotly debated, with companies in the U.S., Australia, and the United Kingdom reporting difficulty finding skilled workers in specific occupations and various economists arguing that little shortage exists.[11] A 2014 report by Accenture argues that skill shortages are threatening the growth of U.S. manufacturing.[12] German firms operating in the U.S. have reported that skill mismatches can be severe enough to impact their interest in investing in the U.S. Their voices became loud enough to influence the German Embassy in the U.S. to launch the German Skills Initiative to enlist partners helping to develop high quality occupation skills in the U.S. context.

Why do skill shortages and youth unemployment coexist in the U.S.? What limits the ability of jobseekers from filling available jobs? One answer is the failure of the U.S. educational system to prepare young people sufficiently for today's world of work. In an effort to educate young people sufficiently, the U.S. invests a higher dollar amount per student than nearly all other OECD countries. However, far too little is devoted to the development of occupational and employability skills. Some European countries with a similar "academic only" focus experience even more acute youth unemployment and skill mismatch problems. France, Italy, and Spain spend almost as much on education per student as does Germany, yet have experienced far higher youth unemployment rates, even before the disastrous levels of joblessness taking place in the current recession.

Although employment levels, productivity, living standards, and economic mobility depend on many factors, including business cycles, trade, immigration, regulatory policies, and tax-transfer programs, we believe each country's education and training approach plays a critical role. What is the U.S. approach to skill development?

VARIATIONS IN SKILL DEVELOPMENT STRATEGIES

Countries vary widely in the way they prepare workers for careers. Nearly all countries rely on schools to teach students basic capabilities in literacy, numeracy, and physical and social sciences. At age 13-14 and beyond, the variations across countries become prominent.

Many countries rely almost entirely on formal schooling to develop the skills needed for careers. Although some courses are designed to prepare for specific occupations, often the jobs and careers are not closely linked to what students are learning in school. Only when students exit the school system do they seek jobs and enter careers. The hierarchy of skills goes together with the hierarchy of school attainment; that is, the longer one stays productively in school, the higher skills individuals attain. Thus, reaching a well-paid salary involves attaining as high a level of formal education as possible and then going out to find a job or career. This image may understate the linkages that occur in practice between workers, employers, and school programs, since many students work part-time, take internships, and a few courses have industry partners. Still, the models are overwhelmingly school-based. In these countries, employers are expected to undertake training themselves for skills not learned in school, such as occupational and firm-specific skills.

In recent years, countries with school-based systems have experienced large increases in the share of young people participating in post-secondary education. One view is that the increased enrollment represents a kind of academic drift, whereby the added levels of schooling correspond to individual incentives but not to the actual skill needs of employers. The OECD reports that the incidence of a skills mismatch is about 60 percent of youth.

One alternative to school-based strategies is the dual system that mixes employer-related training with related coursework. Under this approach, young people prepare for a wide range of careers by gaining occupational mastery though study and practice. As apprentices, young people contribute to their employer's output, receive some compensation, learn on the job, and take related courses. Employers pay for the wages and for the time of trainers as young people. Usually, the government pays the cost of the academic instruction. The search for an employer takes place by late secondary school, with the student having to find a workplace position well before leaving formal schooling.

Other variations in skill development have to with the timing of training. Most large dual systems focus on young workers. Under these programs, it is natural for the government to finance the related courses, since educating students at least through high school is normally a government function. When the dual system focuses on working with young people well beyond the normal secondary school ages, funding even for the academic component of the training becomes more of a discretionary expense.

Most countries provide support to train disadvantaged and displaced adults. These programs generally help a small share of the workforce and the results are mixed. The type of career training varies across programs from formal community college programs to short-term on-the-job training programs. These are commonly viewed as second-chance programs. The evidence from U.S. programs indicates that participants gain enough to offset the costs but not enough to have a significant effect on living standards or career development.

THRUST OF U.S. EDUCATION AND TRAINING APPROACH

U.S. policymakers and researchers focus almost entirely on schools and on other government-sponsored education and training. Public and private spending on formal education at all levels is nearly 8 percent of GDP (over $1.1 trillion in 2010), a higher percentage than nearly all other OECD countries. Although employers are the eventual users of worker skills, policymakers have weak contact with the employer community. Spending on occupational and other work-related training in the U.S. represents a small fraction of education spending. In part, the resource allocation reflects the way the U.S. measures the quality of preparation of students for the workplace. The key indicators are years of schooling and level of degree as well as general academic tests of reading, writing, and math. Rarely do policymakers and policy researchers use information on what employers report they value most, occupational skills and workplace skills such as problem-solving, communication, responsibility, and punctuality.

What is measured with regard to skills and human capital investments affects policy in several ways. Policymakers and researchers citing racial and ethnic gaps in skills rely almost exclusively on differences in educational attainment and academic tests. With skills defined almost solely in educational terms, it is not surprising that the policy debates and funding are directed primarily toward fixing education and schools. Charter schools, vouchers, and teacher incentives are among many reforms that generate heated discussions and political conflicts. The latest educational fix is the adoption of the "common core" standard for what students should learn to be college or career ready. In fact, the curricula is clearly oriented toward college and not careers. Another example is President Obama's goal for the U.S. to reach the highest proportion of college graduates in the world by 2020. Achieving the goal would require raising the share of young people graduating a two-year or four-year college from about 40 to about 60 percent. This prescription draws the support of academic economists, such as Claudia Goldin and Lawrence Katz. They argue that the slowdown in the growth of college graduates, together with expanding demand for skill linked to technological change, played the central role in rising college-high school wage differentials.[13] By implication, resuming healthy growth in college completion is likely to reduce or at least slow the increase in wage inequality.

Notwithstanding high levels of spending in the U.S. on education, educational outcomes are at best mixed. Economic returns to a college education are high, but highly variable.[14] This result is hardly surprising, giving the heterogeneity of colleges in the U.S. and wide differences in salaries by major. U.S. rates of BA completion have inched up in recent years to about 36 percent, a level only slightly above the OECD average.[15] The share with a degree from a two-year college program, or Associate's degree, has remained constant at about 8 to 9 percent. According to international tests of adult literacy, only 24 percent of adult college graduates reach the highest two levels of literacy proficiency and only 18 percent the highest two in numeracy.[16] The overall figures for the U.S. show much higher than average proportions of adults at the lowest levels of literacy and numeracy than the average for all participating countries.[17] In addition, rates of high school completion fall short as well.[18] Turning to sub-BA programs, the results are again highly uneven. Only about 20 percent of the nearly 1 million students entering public, two-year colleges complete their degree programs within 150 percent of the normal time. At the same time, nearly 200,000 receive certificates in

an occupational area based on one to four years of study. Average returns to those completing Associate's degree programs are high, but again highly variable by major.

Another striking result of the U.S. education system is the wide variation in outcomes by sex and by ethnicity. As of 2014, only 40 percent of 25-34 year old men reported having completed at least a two-year degree, a level far below the nearly 50 percent of females with at least a two-year degree. For minorities, the gap is even wider. In 2012-2013, black females earned about 124,000 BA degrees while only 67,000 BAs were awarded to black males.

Given the U.S. educational system's limited focus and its mediocre and variable results, it is not surprising that employers complain about weaknesses in occupational skills. What about job training in the U.S.? Here, the focus is almost entirely on the funding and research of government-funded programs designated as training programs. However, far more students are trying to learn occupational skills in community colleges and career colleges than in federally-sponsored training programs. Evidence suggests that an even larger amount of dollars are spent by employers on training for their own workers.[19] Yet, no systematic surveys of training activities by representative samples of employers have been undertaken since the mid-1990s. Thus, it is not surprising that policy discussions address mostly government-sponsored training policies. Only recently has the U.S. government begun collecting the occupational certifications of individuals. Perhaps the limited data on occupational skills is one reason it is difficult to resolve questions about the importance of the structural character of unemployment—joblessness that results from skill and geographic mismatches. Moreover, the declining amount of work experience among youth, especially minority youth, is no longer viewed as a serious problem because students are expected to accumulate skills almost entirely from schooling.

Potential Gains from Expanding Apprenticeship in the U.S.

Apprenticeships combine classroom-based vocational education, structured work-based learning, and paid work and production to help youth master an occupation. They are subject to externally imposed training standards, 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. Unlike the normal part-time jobs of high school and college students, apprenticeships integrate what young people learn on the job and in the classroom. 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.

Apprenticeship beginning during the high school years can play a positive role in reengaging American youth, as evidenced in other countries. As researcher Robert Halpern discovered, "Apprenticeship provides experience that young people can acquire in no other way," as they work in disciplines that are interesting and new.[20] The benefits extend to the development of young people. Youth apprenticeship helps young people develop independence and self-confidence through their ability to perform difficult tasks. 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. While apprentices are expected to demonstrate professionalism and care, they are not expected to be perfect. Youth try out new identities in an occupational arena and experience learning in a context of production, of making things.

Apprenticeships offer a way of involving constructive adults that makes sense to young people. Apprentices work with adult mentors experienced in a given field, who offer guidance but allow youth to make their own mistakes. Youth see themselves judged by the established standards of the occupation in actual working environments, facing deadlines and the constraints and unexpected difficulties that arise in a profession. Supervisors' monitoring helps apprentices focus on performing well at work and in the classroom. Often, apprentices who do not perform well in their courses lose their jobs as apprentices. Unlike typical part-time jobs, high school and college students in apprenticeships integrate what they learn on the job with what learn in the class-

room.

Apprenticeships can accommodate differences in learning styles. Apprenticeships give workers who are bored in school or who doubt the value of education increased confidence that their efforts and investment in skill development will pay off. 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. Thus, a robust apprenticeship system can narrow the gender gaps in postsecondary credentials. Currently, only 24 percent of 25-34 year old African-American and 17 percent of Hispanic men had attained an Associate of Arts (AA) or Bachelor of Arts (BA) degree as of March 2013. In contrast, AA or BA completion rates were 37 percent for African-American women and 27 percent for Hispanic women.

One important advantage of apprenticeships is their low costs. Employers pay wages for the work of apprentices as well as the costs of work-based training. But, they often recoup the costs during the apprenticeship itself though the productivity of the apprentices. Participants forego little or no earnings because apprenticeships are jobs that pay market or modestly below-market wages. The government costs are modest in comparison to full-time schooling. Even if the government shoulders the full costs of formal classroom instruction linked to the apprenticeship, the time and costs are far less than for a community college student.

Additionally, apprenticeships are a useful tool for enhancing youth development. Young people work with natural adult mentors who offer guidance but allow youth to make their own mistakes.[21] 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.

Apprenticeships are distinctive in enhancing both the worker supply side and the employer demand side of the labor market. On the supply side, 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 benefits exceed the gains they would have accumulated after graduating from community college.[22] The latest reports from the state of Washington show that the gains in earnings from various education and training programs far surpassed the gains to all other alternatives.[23] A broad study of apprenticeship in ten U.S. states also documents large and statistically significant earnings gains from participating in apprenticeship.[24]

On the demand side, employers can feel comfortable upgrading their jobs knowing that their apprenticeship programs will ensure an adequate supply of well-trained workers. High levels of apprenticeship activity in Australia, Great Britain, and Canada demonstrate that even companies in labor markets with few restrictions on hiring, firing, and wages are willing to invest in apprenticeship training. While no rigorous evidence is available about the apprenticeship's costs and benefits to U.S. employers, research in other countries indicates that employers gain financially from their apprenticeship investments.[25]

Firms reap several advantages from their apprenticeship investments. They save significant sums in recruitment and training costs, in reduced errors in placing employees, in avoiding excessive costs when the demand for skilled workers cannot be quickly filled, and in knowing that all employees are well-versed with company procedures. One benefit to firms rarely captured in studies is the positive impact of apprenticeships on innovation. Well-trained workers are more likely to understand the complexities of a firm's production processes and therefore identify and implement technological improvements, especially incremental innovations to improve existing products and processes. A study of German establishments documented this connection and found a clear relationship between the extent of in-company training and subsequent innovation.[26] In the United States, evidence from surveys of more than 900 employers indicates that the overwhelming majority of them believe their programs are valuable and involve net gains.[27] Nearly all sponsors reported that the apprenticeship program helps them meet their skill demands—87 percent reported that they would

strongly recommend registered apprenticeships, and another 11 percent recommended apprenticeships with some reservations. Other benefits of apprenticeships include reliably documenting appropriate skills, raising worker productivity, increasing worker morale, and reducing safety problems.

Although apprenticeships work well in the U.S. for participants and employers, apprenticeships make up only 0.2 percent of the U.S. labor force, far less than 2.2 percent in Canada, 2.7 percent in Britain, and 3.7 percent in Australia and Germany. In addition, government spending on apprenticeships is tiny compared with spending by other countries and spending on less effective career and community college systems providing education and training for specific occupations. While total government funding for apprenticeship in the U.S. is only about $100-200 per apprentice annually, federal, state, and local government spending annually per participant in two-year public colleges is approximately $11,400.[28]

Clearly, there is vast room for expansion, in terms of both apprenticeships and government support. But, what should be the focus of the expansion? What models should the U.S. emulate? Currently, apprentices in the U.S. typically start when they are in their mid-20s. German and Swiss apprentices begin in their teen years, when schooling is still universally provided. Should U.S. efforts cover both groups or concentrate on youth? How should the expanded apprenticeships in the U.S. be administered, funded, and linked with higher education? The next sections present perspectives on and the experience of three European countries with apprenticeship models in order to shed light on these questions.

EUROPEAN VET AND WORK-BASED EDUCATION MODELS

Since the European Copenhagen process started in 2002 to establish a common transnational area of Vocational Education and Training, VET has undergone significant transformations in Europe.[29] Coupled with the Bologna Process for Higher Education in 1999, the two traditionally distinct education sectors have established a two-pillar system of quality and standards that offer greater transparency, transferability, and permeability. Tools and principles, like European frameworks for qualifications and quality assurance, credit transfer systems, principles for validating non-formal and informal learning, or the Euro-Pass to record people's competencies and qualifications and to make them easily understood across Europe, have helped to portray VET's value. Initiatives promoting work-based education and apprenticeships have been instrumental in strengthening VET as a core element in national education and training systems.[30]

European countries are at different levels of development in VET, given the variety of socioeconomic contexts and starting points in the education and training sector. Given the high unemployment in many European countries, VET in general, and apprenticeship in particular, is looked upon as a crucial tool for the European Union and national policymakers. It is a principle strategy for preparing young people for today's and tomorrow's labor market in a world of rapid technological change, demographic change, and economic restructuring. VET should not be seen in isolation, but as part of strong national education and training systems. In European policy, initial and continuing VET share the dual objective of contributing to employability and economic growth, and responding to broader societal challenges, in particular promoting social cohesion.[31]

The creation of National Qualifications Frameworks (NQFs) for Lifelong Learning across Europe is one of the most tangible outcomes of the Copenhagen process to promote VET in Europe. Prior to 2008, NQFs only existed in Ireland, France, and the UK. They were triggered by the launch of the European Qualifications Framework (EQF) in 2008 by the European Parliament and the Council of the EU. The EQF was developed to assist with lifelong learning and mobility by making qualifications from different countries easier to understand and to recognize. The levels span the full scale of qualifications, from basic education, to VET, to doctorates. The participating countries agreed on the focus on competencies and learning outcomes as a basis for better communication and cooperation in education and training, and between education and the labor market. The consistent use of the learning outcomes principle is directly relevant to end-users. Furthermore, this supports a common language between different types of VET, general and higher education, to better address the requirements of lifelong learning.[32]

Traditionally, general education and vocational education are viewed hierarchically, with general education linked to higher academic tracks and a higher societal recognition. Vocational or professional training has been regarded as being functionally linked to the world of work. With the increasing emphasis on the global competitiveness of European economies, as well as to overcome traditional societal perceptions of education, reform debates currently focus on reorganizing upper secondary general education toward a stronger job orientation and improved lifelong learning.

Features of Work-Based Education

Sustainable and inclusive growth requires continuous investment in people's skills and lifelong learning. VET in Europe is an important part of that investment. Today, about half of all jobs in Europe require medium-level qualifications, many of which are acquired through VET. To have a labor market relevant qualification largely defines the employability of the individual and contributes to economic development and competitiveness. Work-based learning is becoming increasingly popular in Europe. It has been part of the response to alleviate the impact of the economic downturns and make labor market mismatches more visible.

In some European countries, skills shortages in particular sectors remain high, limiting growth potential and curtailing opportunities for economic recovery. Increasing work-based learning is not a magic solution to resolving the current high youth unemployment (22.9 percent in the EU[33]), but it contributes to a better functioning labor market. Countries with strong VET and apprenticeship systems tend to have lower youth unemployment rates (for example, Germany, with 7 percent[34]). Work-based learning can comprise:

- apprenticeships or similar schemes that alternate learning in a VET school and in an enterprise to a substantial share,
- on-the-job training periods in companies within school-based VET, i.e., internships, work placements, or traineeships up to 30 percent of the program, and
- learning in workshops, labs, and firms of VET schools and training centers or in business and industry facilities.

Increasing recognition of the benefits of work-based learning has led to a renaissance of apprenticeship programs and became central to EU and national policy agendas. The European Commission recently launched the European alliance for apprenticeships to boost new initiatives, to develop or strengthen apprenticeships.[35]

Work Experience in Compulsory General Education vs. Work-Based Learning

Bringing work experience to the classroom helps compulsory education learners get acquainted with the world of work. Half of all EU countries have established specific services to help organize work experience within compulsory education provided by a ministry, an agency, schools, or the municipality. Simulated or real business experience that provides learners with an understanding of what it means to run a company is a more common practice, with many countries having long traditions.

To acquaint young people with VET at an early stage, most EU countries include VET elements in compulsory general education. Since 2010, new schemes have been introduced in compulsory general education, for example, in the UK. Teachers play a crucial role in integrating theory with work experience. In France and Austria, professional and social partner organizations help learners and teachers find relevant work experience in most of the occupational areas, such as business administration, IT, and health care. In Denmark, recent reform of compulsory education also aims to forge stronger links with the business world. Regional initiatives introduce VET elements into compulsory schools and bring the teachers of both sectors together. The Dutch technology pact aims at introducing science and technology classes in all primary schools by 2020.[36] In Ireland, the optional transition year that provides work experience and focuses on nonacademic subjects to prepare students for work life, has become more popular in the last years.[37]

Apprenticeships and other forms of work-based learning provide high-quality training for young people and help match learning outcomes to the skills required. They can provide young people and adults with a mix of job-specific and transversal skills that are difficult to acquire in classroom environments. Evidence confirms better employment prospects for young people who have had some work experience, in particular apprenticeships.[38] Relatively low youth unemployment, as, for example, in Austria, Germany, the Netherlands, and Switzerland, has been attributed to the provision of apprenticeships.[39] Apprentices of today could also be the entrepreneurs

of tomorrow. These schemes have therefore moved high up on national, EU, and international policy agendas and are clearly visible in the policy developments of recent years, e.g., the youth guarantee. Increasing apprenticeship places requires a sufficient number of enterprises that are ready to train and youth who select this path. However, only a quarter of Europe's enterprises with more than ten staff take on apprentices and upper secondary VET are largely school-based in many countries.

Work-based elements have been part of school-based VET for a long time in almost all EU countries. In-company training is the most popular type of work-based learning. VET students can acquire business experience in training firms and small scale business in most of the countries. Some recent examples of measures include entrepreneurship camps and simulation games in Germany as well as micro-enterprises in France. Other forms include work simulations in schools, as provided in France and in Denmark.[40]

Employer Involvement and Incentives

Enterprise cooperation in VET goes beyond arrangements to enable and promote relevant and high quality work-based learning. Employers, as social partners, are involved in developing and updating VET programs in many countries. In working groups for curriculum development, employers have a decision-making role in countries such as Germany, while they mainly advise in countries such as France. Employer involvement in curriculum design can also take place as consultation (e.g., in Ireland) or through national, sector, and VET program councils. Sharing responsibility for VET quality assurance or accreditation of institutions are factors driving employer participation in the development of VET and cooperation.[41]

European countries follow different approaches to identify business partners for VET cooperation. They can be led by social partners (e.g., in Denmark) or as an agency or office (e.g., in Belgium), via web platforms (e.g., in the UK) or networks and stakeholder groups (e.g., in Germany, France, Austria, and the UK). Some countries with staff exchange arrangements in place use practitioners from enterprises as guest teachers in VET schools (e.g., in France and the UK). By 2010, seventeen EU member states, including Germany and Austria, were training their VET teachers and trainers to help learners acquire entrepreneurship skills, a measure that not only illustrates VET cooperation, but also supports entrepreneurship. This includes company management training programs, manuals and guidelines, organized visits to companies, and updated teacher training standards. Several countries have introduced guidelines for VET teacher development that include enterprise traineeships. While some of the training measures for VET teachers or trainers focus on business setup skills, most of them aim at stimulating an entrepreneurial mindset in a more general sense.[42]

Governments and social partners are striving to increase the number of apprenticeship places as the economic crisis in 2008 has reduced the opportunities for VET learners to find one. Since 2010, new incentives for enterprises to provide training have been introduced and adjusted in most of the EU member states. Subsidies to enterprises are the most popular incentive and can take the form of a grant and reimbursement of training costs and allowances. Tax benefits appear less popular. In 2013 a one-time bonus for companies offering apprenticeship training was introduced in Austria. In Denmark, all employers, both public and private, pay an amount into a fund called the "employers' reimbursement scheme." This fund finances both VET and adult vocational continuing training. In 2012, all employers were obliged to pay an annual contribution of €393 per full-time employee. These funds are then allocated to the places offering apprenticeships, so they do not bear the cost of training alone. Employers receive wage reimbursement during apprentices' periods of college-based training. Ireland currently has a pilot direct cash incentive to encourage private, community, nonprofit, and voluntary sector employers to hire long-term unemployed individuals. France has a bonus-malus system. Companies not reaching the threshold of 4 percent of staff being employee-apprentices or employed under vocational training contracts, pay a contribution. But companies above the threshold are paid a bonus of €400 for each learner, up to a limit of 6 percent of the total workforce.[43]

VET AND WORK-BASED EDUCATION IN GERMANY, SWITZERLAND, AND THE UNITED KINGDOM

The predominant strategies of countries in Europe try to achieve parity of esteem between practical-training and school-based forms of secondary vocational education via vocational enhancement, linkages, or variation of both.[44] Vocational enhancement can be regarded as an attempt to upgrade institutionally organized VET. Vocational education as a whole being clearly job-oriented receives a greater appreciation (e.g., in Germany). Recent reform developments concerning vocational education additionally focus on the integration of apprentice-based and academic-based education, e.g., in dual study programs. The strategy to link workforce-based and school-based VET, e.g., in the United Kingdom, focuses on an identical system of certification and recognition for general education and vocational education, which simplifies the connections between the two education system components. Furthermore, Scotland tries to eliminate the distinction between general education and vocational education and training by unifying the whole education system. Switzerland's education policy successfully follows both strategy types.

Germany

In the German dual initial VET system, training places are offered by both private and public enterprises, in practices of the liberal professions, and, to a very limited extent, in private households as well. In 2012, 21.3 percent of enterprises provided apprenticeships including smaller firms covering over 80 percent. Small and medium-sized enterprises (SME) are often unable to provide all the practical learning content. They may lack suitable training personnel, or, owing to their particular specialization, they do not cover all the training content themselves. There are various ways to overcome these problems. Educational institutions offer inter-company training periods in specific vocational training centers, designed to supplement in-company training. They are often sponsored by autonomous bodies in the relevant sectors of industry. Enterprises form the following coherent training structures:

- "Lead enterprise with partner enterprise" model: the lead enterprise bears overall responsibility for training, but parts of the training are conducted in various partner enterprises.

- "Training to order" model: some periods of training take place outside the regular enterprise, perhaps in a nearby large enterprise with a training workshop, on the basis of an order and a cost reimbursement.

- "Training consortium" model: several SMEs work together taking on trainees. If one enterprise cannot provide a specific learning content the trainee will be trained by a partner enterprise (rotation principle).

- "Training association" model: Cooperating enterprises establish a training organization, which covers the administrative tasks, while the master enterprises offer the training.

The Federal Ministry for Education and Research (BMBF) supports these institutions and cooperation forms with investments and subsidies via the Federal Institute for Vocational Education and Training (BIBB).[45]

Complementing the enterprise training, the apprentices attend part-time vocational schools on one or two days per week and are taught theoretical and practical knowledge related to their occupation. In addition, they attend classes on general subjects

such as economic and social studies and foreign languages. Systematic teaching at vocational school based on subjects and learning fields is a necessary supplement to process-oriented training in the enterprises, which is rather more based on specific in-house requirements. Vocational schools and enterprises have a joint educational responsibility and their tasks are not rigidly divided. The VET school is not exclusively reserved for teaching theory, and in-company training involves more than simply practice. The apprentices are examined and certified by the chambers of industry and commerce or chambers of craft depending on the occupation for which they are trained.

In Germany, the federal states drive full-time vocational schools that cover a period of two or three years depending on the respective occupation and include company placements as well. The final school examinations are supervised by the education authority and governed by the training regulations of the respective occupation. Full-time vocational schools introduce students to one or more occupations and provide them with partial vocational training as well. Today one-year vocational foundation courses are provided at the full-time vocational schools or at a higher general school. The range of training provision in schools of this type is extremely diverse. There are full-time vocational schools, e.g., for occupations in commercial services, craft, health care, and arts.[46]

Almost one of two (48 percent) upper secondary students is enrolled in pre-vocational or vocational programs that combine school and work. The majority (55 percent) of 25 to 64 year old citizens in Germany have attained a vocational qualification at either upper secondary or post-secondary level. They have above-average employment rates, especially among younger adults, of up to 85 percent.[47]

At the same time, the proportion of upper secondary school leaver starting a Bachelor study program has been steadily increasing. Due to rising demand on the labor market and in society, in 2013 more qualified school leavers started a Bachelor program than an apprenticeship. Still, in 2012, over 550,000 learners started an apprenticeship and 210,000 started a full school VET education. Over half of the "dual" starters were under 18 years old and 44 percent were 19 years and older. Less than 4 percent of the starters were over 25.[48]

The dual VET system does not have any formal admission prerequisites. Regardless of their school-leaving certificate, by law all school leavers can learn any recognized occupation requiring formal training. In fact, the admission and the actual number of people who successfully start an apprenticeship depend on the prior qualifications. Most of the dual trainees acquired an intermediate secondary school leaving certificate (43 percent) or a lower secondary school leaving certificate (33 percent). Less than 20 percent of new trainees acquired an upper secondary school leaving certificate combined with a higher education entrance qualification in 2014. Those who could not join an apprenticeship program in Germany are covered by public funded training measures of the so-called transitory system.[49]

GOVERNANCE, LEGAL FRAMEWORK, AND KEY STAKEHOLDERS

The dual VET system in Germany is based on a close partnership between employers, trade unions, the federal government, and the state governments. Social partner labor experts exert considerable influence on the content and form of VET to ensure that their requirements and interests are taken into account. Responsible action by all participants, regardless of specific group interests, is a precondition for the efficiency of the dual system. Social dialogue and co-determination are important for any development in the German VET system.

The German Federal VET Act (BBiG) regulates all major framing legal and operational aspects for vocational training in private and public enterprises. This includes the establishment of training regulations, the occupational titles, the training content and duration, as well as examination or assessment standards. The training regulations establish occupations, which are recognized nationwide and increasingly abroad. Furthermore the VET act regulates the VET quality assurance, the role of the social partners and of the competent bodies in terms of all major aspects of the design, the implementation and the monitoring of training, the apprenticeship contract, and the aptitude of instructors. The Federal Crafts Regulation Act

regulates vocational training in the crafts sector and the Federal States Acts regulate vocational school education in accordance with the federal VET.[50]

The chambers of commerce, industry, and craft as well as the professional organizations as intermediary organizations are private entities with a statutory responsibility. They have important legally-defined tasks: to review the training agreements concerning the conformance of the VET act provisions, to issue regulations pertaining to training, to advise instructors and trainees, to review the suitability of instructors and training facilities, to register, to modify training agreements, to administer trainees' intermediate and final examinations, to monitor the execution of training, to contribute to the workplace curricula, to accredit training companies, and to maintain training centers. They also carry out the examinations and certify the awarded occupational qualifications. The examination committees include VET experts from the trade unions and from the VET school as well.[51]

Before a trainee's training starts, the enterprise and the trainee must sign a written training agreement. The minimum required contents of such agreements are regulated by the VET act and it fixes the training remuneration. The agreements are subject to federal labor law provisions as well and they must be submitted to the relevant chamber or professional organization.

The Federal VET act regulates as well the functions, structure, and tasks of Federal Institute for Vocational Training (BIBB), which operates on behalf of the German federal government and is supervised by the Federal Ministry of Education and Research. It carries out all federal administrative, research, development, and advisory work on initial and advanced VET related topics in Germany and abroad. The board incorporates representatives from the government on the federal level and the federal states level, as well as from the social partners.[52]

VET OCCUPATIONS AND TRAINING REGULATIONS

Apprentices are awarded a nationally-recognized VET diploma in a specific occupation; this diploma provides a basis for a wage grading. As of 2014, 329 occupations were regulated on the federal level. Following the VET act, both the enterprise and the VET school have to use complementary educating and training strategies so that the apprentices develop their occupational, societal, and personal competencies. The professional competencies required by the occupations are described along the lines of knowledge, skills, and abilities in the dual VET curricula specified in each training regulation. Training regulations provide the formal basis for an orderly, standardized training in occupations. These binding requirements guarantee a uniform national standard. Due to the dual character of the apprenticeship, the curricula for the enterprise and the vocational school are designed in a complementary way for each training occupation. This requires a close cooperation between the federal government and the states and gives the social partners, i.e., the employers' and the employees' VET experts, an important role. Furthermore, the training regulations lay down the context and time frame for the training phases and courses and the requirements and criteria for examinations.[53]

As a multi-stakeholder system, dual VET in Germany is financed both by public and private funding. This includes the Federal Ministry of Education and Research, Economics, and Technology as well as Labor and Social Affairs, the Federal Employment Agency, the relevant state ministries, the European Union, local authorities, enterprises, trade unions, chambers, and last but not least, by the apprentices. In this respect, the financing system of VET and continuing general and vocational education differs substantially from the public funding of the schools and universities sector.[54]

Switzerland

The Swiss Vocational and Professional Education and Training system (VPET) enables young people to enter the labor market and ensures that there are enough qualified workers and managers in the future. It forms the basis for lifelong learning, opens up a wealth of job prospects, and offers a broad selection of available education and training options. The VPET system is closely correlated with the labor market and is an integral part of the education system. It is divided into upper-secondary level vocational education and training (VET) and a post-secondary level professional

education and training (PET).

VPET occupations and professions are focused on required competencies. This direct correlation with the labor market is one of the main reasons why Switzerland has one of the lowest youth unemployment rates (5 percent) in Europe. About 30 percent of employers in Switzerland train apprentices and more than two-thirds of young people between the ages of 16 and 19 leaving the compulsory education enroll in a work-based VET program which provides them with a solid foundation in a given occupation.[55]

Dual-track VET programs covering part-time apprenticeships at enterprises and part-time classroom instruction at vocational schools are the most common form of vocational education and training in Switzerland. At the host company, the apprentices learn the practical know-how, knowledge, and skills needed for their chosen occupation. Learners actively take part in the host company's production and business processes. In some cases, host companies may wish to combine their strengths to offer one or more apprenticeships in a modular format. Vocational schools provide classroom instruction in vocational subjects as well as general education subjects, for example, language, communication, and societal topics. Classroom instruction intends to develop the technical, methodological, and social skills of learners while imparting the theoretical and general principles needed to perform occupational tasks. It covers one or two days per week. Vocational schools also offer preparatory courses for a Federal Vocational Baccalaureate Examination, an advanced VET track. Branch courses are offered to complement classroom instruction at vocational schools and apprenticeship training at host companies by providing learners with essential practical skills. They are often carried out at third-party training centers run by the industries involved.[56]

Less common are school-based VET programs, i.e., full-time classroom instruction with few practical phases in companies. School-based VET programs are generally offered by trade schools or commercial schools. School-based VET programs at vocational schools are more popular among learners in the French and Italian-speaking regions of Switzerland than among those in the German-speaking region, which might be influenced by the predominant school-based VET systems in France and Italy.[57]

Adults may acquire VET qualifications by various means. In this regard the Federal Vocational and Professional Education and Training Act offer several avenues from regulated, structured procedures for occupational categories to individual recognition procedures.[58]

GOVERNANCE AND FINANCING

The federal government plays a mediating role. It safeguards the conditions for enterprises, encourages the provision of apprenticeship positions, and helps young people choose an occupation. The VPET system is collectively governed by the Swiss federal government, the regional cantons, and the professional organizations. These three main partners work together to maintain a high level of quality within the VPET system. They also strive to ensure that there is an adequate supply of apprenticeship positions and training options. This partnership and the respective areas of responsibility of each partner are set forth in the Federal Vocational and Professional Education and Training Act and its corresponding ordinances. The main purpose of involving vocational schools, host companies, and sector training centers is to ensure high quality within the VPET system. The responsibilities of each stakeholder depend on the tasks assigned to each of the three main partners within the VPET system. In areas where responsibilities overlap, they work together on the specific situations and matter at hand. The VET sector is funded by the Confederation, the cantons, and professional organizations, each to their own degree.[59]

The current Swiss VET Act implemented in 2005 enacted a fundamental reform of the VET system. It confirmed the administrative autonomy of the cantons and the legislative power for the entire VET system at the federal level. The Swiss Federal Institute for Vocational Education and Technology (SFIVET) became the central institution for the coordination and the support of the VET system. It encompasses basic and continuing training of vocational teachers and trainers as well as research and development for the government and for professional associations. The Federal Office of Economic Affairs safeguards a

strong system of career guidance and counseling to advise and support students at key transition points in education and career development.[60]

Nongovernmental VET stakeholders have a formal convening role to contribute to the development in VET in accordance with the principle of subsidiarity:

- Employers and trade unions as social partners contribute to the design, the implementation, and the monitoring of VET programs.

- Chambers of commerce and professional organizations, being private entities, have statutory responsibility to contribute to the workplace curricula, accrediting training companies, examinations testing and certifying qualifications, and maintaining training centers.

- Professional organizations structured in clusters of industries or occupations contribute as well to all program-related process such as design and revisions of training regulations.

The VET act includes detailed rules for establishing occupational titles, the content and duration of the training, as well as examination or assessment standards stipulating the requirements to be met for certification. VET programs are based on defined curricula, training options, and national qualification procedures. There are around 230 occupations to choose from. Depending on the occupation, an apprenticeship takes two to four years. Apprenticeships include all kinds of professions, from craft, mechanics, carpentry, baker, and hairdressing to office work such as office assistant, bookkeeper, IT specialist, etc. VET qualifications are highly portable within the country and increasingly abroad. Apprentice graduates are awarded a legally protected title of a qualified professional. Revisions of training regulations involve vocational trainers and teachers, cantonal experts, employer and union representatives, instructors for intercompany training courses concerning the objectives autonomy, process orientation, reflection, self-assessment, action orientation, and technical, social, and methodological skills.[61]

Apprenticeship marketing is a cantonal task because cantonal VET offices are familiar with the conditions in their regions. They also establish and maintain contacts with local businesses. Accordingly, they are the best placed to assess the number of available apprenticeships, to take suitable measures at the right time, and to offer individual support to young people in their search for an apprenticeship position. If the apprenticeship situation is strained, then the federal government may step in to offer additional financial incentives. The most important apprenticeship marketing measures are information and advice on careers, apprenticeship records, creation of host company networks, provision of state-sponsored transitional options, dealing directly with companies via VET agents, encouraging them to create apprenticeship positions, and placement and individual mentoring of young people who have been unable to find a suitable apprenticeship.[62]

TRANSITION BETWEEN LOWER AND UPPER-SECONDARY LEVELS OF EDUCATION

Transitional options are available to young people completing compulsory education who have been unable to make an immediate transition to the upper-secondary level. They include practical trainings and pre-apprenticeships and are generally designed to prepare young people for enrollment in VET programs. Two-year VET programs provide young people with more practical skills to achieve a recognized qualification for a specific occupational profile. Graduates of the two-year VET program may enroll directly in a three or four-year VET program leading to the Federal VET Diploma. Three-year or four-year VET programs provide learners with the competences needed to work in a specific occupation and open access to tertiary-level professional education and training (PET). Learners also have the option to prepare for the Federal Vocational Baccalaureate (FVB) either during their training or after graduation.[63]

United Kingdom

A large number of VET qualifications exist within the qualifications frameworks in the UK, offering a broad choice of programs. VET is available across most levels of the qualifications frameworks in the UK, ranging from introductory initial VET courses in secondary schools and colleges to programs at higher education level. It can be found in the shape of

school-based programs which combine general academic study with vocational elements, broad vocational programs, and specialist occupational programs that take place both in a school setting and the work place. VET is offered on a full-time and a part-time basis and students may attend schooling on a block-release or day-release basis from employers or attend evening or weekend learning. Skills for Work courses may be studied in secondary schools in Scotland, often in partnership with a local tertiary college and employer. These programs form part of the National Courses, provide an introduction to vocational learning, and include experiential learning, which prepares learners for further VET and for employment. Vocational subjects at upper secondary level are available in the General Certificate of Education Advanced level (GCE A level) program too. The GCE A levels in Applied Subjects replaced the Vocational Certificate of Education (VCE) at Advanced level. These are work-related qualifications designed to combine a broad area of study with a focus on a specific industry sector.[64]

Although school-based VET is traditionally strong in the UK, the government has successfully promoted apprenticeships in the last few years via the National Apprenticeship Service and the figures are increasing. There is a general political consensus in the UK that apprenticeships are important in dealing with the country's intermediate skills deficit.

Apprenticeships in UK include a work contract and an occupational qualification within the Qualifications and Credit Framework. They are classified as paid jobs that incorporate on and off the job training. Following the Government Minimum Standards for apprenticeships, they require a minimum length of 12 months, 280 hours guided learning off the job, being employed for 30 hours a week, and a Training level 2 in functional skills or in math and in English. Apprentices have to sign an apprenticeship agreement with their employer. This is a contract stipulating the framework being followed and the skill, trade, or occupation the apprentices are working in. It is not a legally binding contract of employment, but without it an apprenticeship completion certificate cannot be issued. A successful apprentice will receive a nationally recognized qualification on completion of his or her contract.

Apprenticeships are available at the intermediate level (QCF level 2), advanced level (QCF level 3), and higher level (QCF levels 4 and 5). Scottish Modern Apprenticeships correspond to Scottish Credit and Qualifications Framework levels 5, 6, and 7. Recent changes have introduced Technical Apprenticeships at SCQF levels 8 and 9 as well as Professional Apprenticeships at SCQF levels 10 and above in place of Modern Apprenticeships at these levels. Technical Apprenticeships are studied alongside Scottish Vocational Qualifications level 4, while Professional Apprenticeships are available alongside SVQ level 5.[65]

The number of employers currently taking on apprentices has risen sharply in recent years. Apprenticeships increased from under 500,000 in 2009/2010 to over 850,000 in 2013/2014. The majority of people starting apprenticeships chose frameworks in the service sectors, such as business administration, retail, and health.

There were large increases in the number of starts between 2009/2010 and 2010/2011 for both Intermediate and Advanced Level apprenticeships. The number of Intermediate Level apprenticeship starts has more than doubled since 2002/2003, while the number of Advanced Level apprenticeship starts has almost tripled. In 2009/2010, 11 percent of under-19s start an apprenticeship in England, 42 percent for 19-24 year olds, and 37 percent for those over 25. Over 6 in 10 apprenticeship starts were at the Intermediate level and only 1 percent were at a higher level. Entrance requirements to apprenticeships vary depending on the occupational area and the level of the qualifications framework. Competition for apprenticeship places is fierce and good standard grades in English and mathematics are sometimes necessary.

The entrance age in vocational education and training has been raised in the UK to 18 in 2014. In England, the Young Apprenticeship program that offered 14-16 year old pupils the opportunity to undertake industry specific VET alongside the GCSE program was closed for the last pupils in 2012/2013 as the costs of running the program was considered too high in the current economic climate. Over 9,000 pupils started the Young Apprenticeship program in

2010.

The last few years have witnessed a rise in adult apprentices who now outnumber under-19 apprentices. There has been a sharp rise in the number of apprenticeships started by people aged 25 and over since 2009/10: 161,600 people aged 25 or over started apprenticeships in 2013/14, more than three times as many as in 2009/10. In the Scottish Modern Apprenticeship program, the figures for adult starters have increased in recent years as a result of a successful partnership between employers, training providers, and the public sector.[66]

GOVERNANCE AND FINANCING

There is a big consensus in the UK among all stakeholders in business, trade unions, and government to promote apprenticeship in terms of labor, education and training, and societal demands for work-based learning in the UK. In 2011, the Education Act modified the Apprenticeships, Skills, Children, and Learning Act from 2009 to fund an apprenticeship place to all qualified young people aged 16-19 who already secured one place.

The Specification of Apprenticeship Standards (England) sets out minimum academic requirements that all frameworks must meet. It stipulates minimum qualification levels required of successful apprentices under the vocational, technical, and key skills elements of the apprenticeship. It also specifies standards of attainment expected from successful apprentices, including "team working" and "effective presentation." The apprentice must be 16 to 24 years old when hired.

The National Apprenticeship Service (NAS) has responsibility for apprenticeships in England. The NAS was created in April 2009 and is responsible for promoting apprenticeships to employers and learners, supporting employers through the process of recruiting and training an apprentice, and maintaining the national online apprenticeship vacancies system which allows employers to post vacancies for aspiring apprentices. Apprenticeship Training Agencies (ATAs) are organizations directly employing apprentices. The enterprise hosting the apprentice operates as the apprentice's day-to-day workplace and manager. The ATA coordinates the apprentice's training and pays associated training costs. The host employer pays the ATA a fee based on the apprentice's wage and training costs. ATAs were first introduced in 2009 and are listed by region on the NAS website.

There are 170 different apprenticeship frameworks available in 13 broad sector subject areas. The majority of people starting apprenticeships chose frameworks in the service sectors. Almost three-quarters of starts were in business, administration, and law; in health, public services, and care; and in retail and commercial enterprise.

A typical apprenticeship framework includes a National Vocational Qualification, which examines the apprentices' work-based skills; a Technical Certificate, which examines the apprentices' theoretical knowledge; Key Skills, which examine the apprentices' transferrable skills, for example, numeracy and literacy; and employer rights and responsibilities. The main BTEC (Business and Technology Education Council) qualifications comprise Awards, Certificates, and Diplomas at First (QCF level 2), National (level 3), and Higher National (levels 4 and 5) levels. These programs combine theoretical and practical vocational education and can form part of an apprenticeship program.[67]

Incentives are in place to further enhance employer engagement in apprenticeships with particular emphasis on small and medium enterprises. Cost factors to employers, such as administration, apprentices' time away from the workplace, and employees' time spent to train apprentices, has been found to be a reason for not participating, particularly by smaller employers. Despite this, research has shown that apprentices provide good value for money for employers in the long term in terms of increased, specialized skills, employee loyalty, new innovative ideas, and as future management potentials. The government is working toward removing regulations and bureaucracy that may discourage employers, SMEs in particular, to take on apprentices.[68]

The UK government's Apprenticeship Grant for Employers provides financial assistance for businesses employing less than 1,000 people to take on

16 to 24 year old apprentices within a formal apprenticeship program.

In April 2012, the Small Employer Incentive to Employ an Apprentice in England offers payments to small enterprises that currently do not employ any apprentices, but wish to do so. For 16 to 24 year olds under this program, the grants are £1,500 per apprentice. Another scheme provides subsidies to firms with 50 or fewer employees when they take on an apprentice. To be eligible for payment, the employer must not have taken on an apprentice in the last 12 months.

For all employers, the government pays a proportion of the training costs for apprentices, depending on their age: 100 percent of the training costs if the apprentice is 16-18, 50 percent of the training costs if the apprentice is 19-24, and up to 50 percent of the training costs if the apprentice is aged over 25. The apprentice's employer will normally cover any remaining training costs. If employers choose to deliver additional qualifications as part of an apprenticeship on top of those identified by the relevant Sector Skills Council, then these qualifications will be paid for by the employer not by the government. Apprentices are entitled to minimum wages.

Advanced Learning loans can help apprentices aged 24 and over studying at Level 3 and above. Employers contribute up to half of the training costs and apprentices are expected to contribute the remainder through Advanced Learning loans. This is the first time apprentices have been expected to contribute toward the costs of their learning.

Further standards are coming into use in the 2015/2016 academic year. To give employers greater control over spending on training delivery, the government will route apprenticeship funding through employers rather than paying training providers directly. The 2015 budget announced employers will be given funding control through a digital Apprenticeship Voucher.[69]

OTHER WORK-BASED PROGRAMS IN THE UK

England introduced a new traineeship program in 2013 for youth under age 25. It is designed to provide young, unemployed people who have little work experience and low qualifications with skills and work experience in preparation for apprenticeships and employment. The core content comprises literacy and numeracy, work preparation training, and a work placement. Traineeships provide education, training, and work experience to young people to help them get an apprenticeship or other job. They are suitable for people who are unemployed and have little work experience but can be prepared for employment or an apprenticeship within six months. Traineeships last between six weeks and six months.

The Pathways to Apprenticeship program in Wales is a one-year, full-time CQF level 2 vocational qualification program designed to give 16-24 year olds the foundation skills to progress on to and complete a full apprenticeship. This training includes associated essential skills and other relevant accredited vocational qualifications. Traineeships are also available for 16-18 year olds in Wales and provide demand-oriented training to help learners progress to further learning, apprenticeships, and employment; most trainees (62 percent) successfully progressed to an apprenticeship, to an employment, or to a further education.

The Steps to Employment scheme also helps unemployed adults to access work experience and training in preparation for employment and further learning. Scottish learning providers offer additional skills training opportunities, through the Targeted Pathways to Modern Apprenticeships scheme, that are designed to help young people gain the skills to enter apprenticeships or employment. The training is targeted toward seven key sectors and programs include employability skills, basic occupational skills, and employer experience, and leads to a recognized vocational qualification or certification.[70]

Transitions from VET to Advanced VET and Higher Education

Europe faces an ongoing demand for advanced and higher education qualifications to address the increasing skill requirements of employers. Opportunities to acquire VET qualifications at the higher education level are expanding. Modern technology allows using learning offers both across geographic and institutional boundaries. All European

countries participating in the Copenhagen process agreed to promote seamless education, training pathways, stackable VET qualifications, and appropriate procedures to recognize prior learning. Simultaneously, the EU developed competency-oriented reference instruments like the European Qualifications Frameworks to promote transparency and permeability in education and training across sectors and countries. In European VET policy debates, improving the permeability between VET and academic higher education is a primary issue. The terms, apprentice-based and school-based postsecondary education, are being replaced by practice-integrated learning and full-time education. Another distinction is training that makes advancement in the occupation possible and further adaptive training aimed at maintaining or extending vocational knowledge, skills, and competencies and updating them in line with technical or economic developments.[71]

REGULATORY FRAMEWORKS

Under the German federal VET act, regulations on advanced VET occupations are issued by the federal government (BMBF) and by competent bodies. Advanced VET entitles the holder to practice a craft trade independently and to employ and train apprentices. In addition, it enables access to occupation-oriented programs at craft academies and universities for applied science. Trade and technical schools offer courses in the fields of agronomy, design, engineering, business, and social affairs, with over 160 individual subjects, examined under state law. For admission to a trade or technical school, an applicant requires a qualification in a recognized training occupation relevant to the subject and the recent work experience concerned, or a qualification from a full-time vocational school and relevant work experience of at least five years.[72]

The Swiss postsecondary professional education and training (PET) builds from upper-secondary level vocational education and training (VET). It provides professionals with specific competencies and prepares them for highly technical and managerial positions. There are around 400 federal PET qualifications as well as 57 professional college degree programs in 8 different professional fields. PET programs combine classroom instruction with work-based training as well. The work-based component of PET programs is realized either through an internship or a regular job. Internships are typically for full-time students, especially in professional colleges, where they form an integral part of the program. Part-time students typically continue to work in regular jobs alongside their PET studies. But in this case, the student's work has to be related to PET studies. Most of the costs of PET programs are borne by companies and by individuals.

Labor market stakeholders are remarkably well integrated into the Swiss PET system. The qualifications offered are largely determined by labor market associations. Employer and professional organizations largely define the content of professional examinations as well as professional college degree programs. The content is determined by different employers in order to build consensus on a professional profile.

In contrast to other education sectors in Switzerland, PET is mainly steered on the federal level. The Office for Professional Education and Training (OPET), the responsible federal body, carefully manages a partnership with labor market organizations and the relationship with training providers, engages in a constant dialogue with PET stakeholders, and provides strategic leadership. The main purpose of having all three partners involved is to ensure high quality within the PET system. The responsibilities of each stakeholder depend on the tasks assigned in the PET act. In areas where responsibilities overlap, the stakeholders cooperate in the specific situations and matter at hand.[73]

The United Kingdom Further Education and Training Act amended in 2007 regulates the entry requirements, the quality assurance, the accreditation, and the transfer to VET oriented academic programs. Advanced VET programs build on initial VET apprenticeship programs. Further and Higher Education colleges offer courses and qualifications in a wide range of vocational and academic subjects at many levels. The colleges often are linked to companies, so that students studying vocational courses can combine classroom learning with valuable work experience and training phases in companies.[74] VET-oriented Diplomas of Higher Education (DipHE) and

the Higher National Diplomas (HND) address areas in administration and business, agriculture, art and design, bio-technology, construction, business administration, nutrition, chemistry, craft, environment technology, health and social care, IT, mechanics, and product development. These qualifications provide access to further academic Higher Education programs as well. However, these qualifications are not standardized.

Private training providers in the UK offer a wide range of work-based training for students seeking to build careers in specific industries. Private training companies work with colleges and employers to provide practical training and internationally-respected qualifications in subjects such as engineering, construction, information and communication technology (ICT), and health and social care. Entry requirements for these programs are the acquisition of a General Certificate of Secondary Education (GCSE), a Scottish National Certificates, a higher apprenticeship diploma but also the validated recognition of prior work-based learning.

VET at postsecondary tertiary levels can be characterized by an integrated system of certification and recognition in the UK. In fact, Scottish education policy aims at eliminating the distinction between general education and vocational education and training by unifying the whole education system.[75]

The VET-oriented Short Cycle Higher Education programs, including Higher National Certificate (HNC), Higher National Diploma (HND), Diploma of Higher Education (DipHE), as well Certificate of Higher Education (CertHE), are offered by universities and tertiary colleges. These institutions involve social partner experts from chambers of industry and commerce in the program design and are funded by the Scottish Funding Council (SFC). The programs are partially funded by industry sector associations as well and the programs are open for employees, who study part time. The program duration is between one year (HNC/48 ECTS) and two years (DipHE/120 ECTS). They are validated and awarded by the Scottish Qualifications Agency (SQA). Due to the increased labor market demand for these advanced VET qualifications, almost all graduates were appropriately employed within the first six months after graduation.[76]

PERMEABILITY

In Germany, the increasing demand for academic competencies on the labor market is leading to a rise in advanced apprenticeships. Dual study programs are incorporating both initial apprenticeship programs and advanced VET programs linked to universities. In spite of the rising demand, currently only 23 percent of a typical age cohort successfully completed a higher education program and only 2 percent of students did so without university entrance qualifications but with a VET diploma. In order to promote lifelong learning and permeability between the two education sectors in line with the EU policy objectives, the German government is trying to facilitate the transition from VET to academic Higher Education by additional measures. The aim of improving permeability is to make VET more attractive and to shorten educational pathways. Since 2000 the federal government and the states have funded research projects and appropriate instruments related to this goal.

The federal program "Recognition of Vocational Competencies on Higher Education Programs" (ANKOM) focuses on the development of procedures to identify and evaluate competencies acquired in VET and regarded as equivalent to academic requirements in the fields of industrial technology, commerce, IT, healthcare, and social affairs. The aim is to develop transparent and transferable evaluation and offsetting procedures. Furthermore, the federal government together with the state authorities and the social partners developed and implemented various qualifications framework to promote transparency, comparability, and quality development of qualifications. The VET sector first implemented an Advanced IT framework in 2002 and finally published a framework for all advanced VET qualifications in 2014. In 2011 the German Qualifications Framework for Lifelong Learning (DQR) encompassed all qualifications within the German educational system across every field of education and training for the first time. As the national implementation of the European Qualifications Framework (EQF), the DQR considers the specific characteristics of the German education system and VET qualifications. The objective is to

make equivalences and differences between qualifications more transparent and to support permeability to promote the mobility of learners and employees across sectors in Germany and toward other European countries. This competency-based reference instrument tries to promote quality assurance and development of qualifications along learning outcomes.[77]

In Switzerland, progression from upper secondary VET to PET is well regulated in pathways, allowing graduate apprentices both to deepen their professional knowledge and to acquire general entrepreneurship and leadership skills, supporting promotion into management positions or independent professional roles. Such good articulation helps to maintain the high status of the vocational track. PET graduates can often compete for the same jobs as graduates of universities of applied sciences (UAS) or universities and often cover senior management positions. The VPET system is characterized by a highly in degree of qualification "stackability." A credit system keeps track of prior education and training and makes it much easier for learners to pursue further education and training opportunities, to switch between VET and PET pathways and general education/higher education pathways, and to change the course of their working lives.

Learners enrolled in three-year or four-year VET programs for the Federal VET Diploma have the option to prepare for the Federal Vocational Baccalaureate (FVB). A preparatory course covers general education subjects and those who pass the FVB examination may enroll in a Swiss university of applied sciences (UAS) without having to take an entrance examination. About 50 percent of students who earn the Federal Baccalaureate enroll in a UAS. Moreover, holders of the FVB can prepare for the University Aptitude Test (UAT), which opens the way for enrollment at a cantonal university or at a federal institute of technology.

The examination for the Federal PET Diploma is intended for professionals who wish to improve their knowledge and skills and specialize in a given field after completing upper-secondary level vocational education and training (VET). Successful candidates are awarded the Federal PET Diploma, which is generally a prerequisite for admittance to the examination for the Advanced Federal PET Diploma. This examination is generally for professionals who have acquired a great deal of expertise in their field or who intend to hold a managerial position in a company. PET programs in technology, economics, design, health, and social work lead to a professional college degree. Professional college degree programs are intended for professionals holding the Federal VET Diploma or equivalent qualification who wish to improve their knowledge and skills and hold managerial positions. These degree programs cover a broader and more general range of topics than those addressed in the two federal examinations described above. Successful candidates are awarded a federally recognized professional college degree.

Professional organizations, structured in clusters of industries or occupations, cooperate with UAS to set up traineeships at the BA level similar to German dual study programs. A very high proportion of young people transfers via apprenticeship to employment, to further education, or to higher education due to the well-regulated and respected seamless pathways in the VPET system.

Unlike EU member states, Switzerland has rejected the idea of a sector-based national qualifications framework along the lines of the EQF. Instead, the Swiss government has developed a National Qualifications Framework for VET only. The objective is to promote the transparency of VET qualifications, the mobility of learners and the high value of the Swiss VPET system. It is intended to link all VPET qualifications to the EQF, when this national reference instrument is accomplished.[78]

The UK is developing its education and training policy along the lifelong learning parameters used by other EU states. Graduates of advanced VET-oriented Short Cycle programs can articulate their award and their prior work-based learning to a Bachelor program without any legal or procedural problems. Permeability within and between education and training pathways is further supported by a cross sector qualifications framework, alignment with the EQF, and promotion of transparency and quality development of qualifications on behalf of the individual learners, education providers, and the labor

market.

The Qualifications and Credit Framework (QCF / 8 levels) for England, Wales, and Northern Ireland and the Scottish Credit and Qualifications Framework (SCQF / 12 levels) have been developed and implemented for these purposes to accommodate together the education and training sectors and lifelong learning in the UK. For example, the VET-oriented qualifications for National Certificates are aligned to SCQF level 6. The Higher National Certificate (HNC), Higher National Diploma (HND), Diploma of Higher Education (DipHE), as well Certificate of Higher Education (CertHE) are aligned to the SCQF levels 7 and 8.[79]

Outlook on Work-Based Education in Europe

Germany, Switzerland, and the UK are European examples of national apprenticeship systems that are legally regulated on the framing and operational aspects of VET and that are supported by public budgets. In Germany and Switzerland, employers and trade unions partner with government administrations to control VET programs. The UK is currently trying to extend the apprenticeship sector with strong government encouragement and funding. In all likelihood, the rising input of England's nongovernmental stakeholders (e.g., employer, chambers, trade unions, etc.) will probably displace the central role of the government bureaucracy in the long run.

All three systems use variations of public-private partnerships to deal with the challenge of organizing sustainable linkages between theory-based and practice-based learning on the initial and the advanced VET level. In contrast to the dual approach of Germany and Switzerland, which predominantly focuses on youth apprenticeships, most apprentices in the UK are adults who require general education approaches and funding that differs from the compulsory general education for young apprentices.

One major reason for the success of the Swiss VPET system and its societal acceptance is the development of seamless and robust education and training pathways. The permeability between VET and Higher Education benefits the individual learners, the economy, and the society. Furthermore, Switzerland supports its system with excellent education and career guidance and counseling by government-driven institutions.

The Copenhagen process has been a major factor in promoting VET in European countries. VET has taken a more prominent position on national policy agendas and, for many national policymakers, the Bruges Communiqué[80] on enhanced European cooperation in VET has become both an inspiration and a catalyst for reform, which set the agenda for VET in Europe by 2020. To improve the quality and efficiency of VET and to enhance its attractiveness, VET should have high relevance for the labor market and people's careers. In order to increase the attractiveness of VET, the Communiqué encourages participating countries to pursue the following actions:

- Raise the quality of initial VET by improving the quality and competences of teachers, trainers, and school leaders; introducing flexible pathways between all education levels; and increasing public awareness of the possibilities which VET offers;

- Encourage practical activities and the provision of high-quality information and guidance that enable young pupils in compulsory education, and their parents, to become acquainted with different vocational trades and career possibilities;

- Ensure that key competences are integrated into initial VET curricula and develop appropriate means of assessment;

- Organize teaching and learning activities that foster the development of career management skills in initial VET;

- Give learners in initial VET access to appropriate up-to-date technical equipment, teaching materials, and infrastructures. VET providers should consider sharing costs and equipment among themselves and in cooperation with businesses. Work-based learning in enterprises that have the relevant infrastructure should also be promoted;

- Monitor the transition of VET graduates to the labor market or to further education and training, using

national monitoring systems.

Furthermore, the Bruges Communiqué stresses the importance of a long-term perspective to promote European VET. Quickly raising the number of apprenticeship places or adapting them continuously by trying to follow every move of the labor market will not serve long-term goals. It is important to get SMEs involved and committed and recent policy measures explicitly target them. Information outlining the benefits of training apprentices, combined with appropriate financial incentives, helps to attract small and medium-sized businesses. But SMEs have to be supported to secure sufficient availability of qualified trainers, to establish and to implement appropriate quality assurance systems, and to organize funding and other types of support for cooperation arrangements with VET institutions. Finally, strong VET-business links help to stimulate entrepreneurial spirit, which can increase employment options for VET learners. VET stakeholders see talent development programs and incubators as successful ways to develop entrepreneurial attitudes.[81]

European countries are currently creating or expanding their work-based learning opportunities that face challenges and constantly need to update and develop their programs, including countries with well-established systems. Even VET systems with long-standing apprenticeship traditions have faced a lack of good quality apprenticeship places during the economic downturn. Strong work-based VET systems, as in Germany, see Lifelong Learning opportunities increasingly as crucial elements to promote VET, especially work-based learning, forward.

The European alliance for apprenticeship, established in 2013, gathered the main stakeholders to promote apprenticeship schemes and initiatives across Europe. The alliance encourages reforming apprenticeship systems and promotes the benefits of apprenticeships and smart use of funding and resources. It also stimulates important players, large companies as well as associations and social partners, to commit themselves to the theme. Developing cooperation to set up or reform apprenticeship schemes that lead to tangible results is a time-consuming process. This is illustrated by the experiences of the German alliances of apprenticeships, which started at the end of 2012 with formal memoranda with six other EU member states. It takes time to change perceptions and mindsets, raise awareness, adapt existing education and training institutions, obtain commitment and support from employers, ensure that teachers and trainers have adequate training opportunities to help them support apprentices, and inform the choices of potential learners and their families.[82]

LESSONS FOR EXPANSION IN THE U.S.

The European experience and U.S. studies showing high earnings returns to apprenticeship are stimulating U.S. policymakers to endorse expanding U.S. apprenticeship. In pursuing President Obama's goal of doubling the number of U.S. registered apprenticeships in five years, his administration has allocated $100 million in competitive grants for states and other organizations to expand apprenticeship slots and proposed increasing the federal allocation for apprenticeship by $2 billion over ten years. Senators Cory Booker (D-New Jersey) and Tim Scott (R-South Carolina) introduced a bill to provide tax credits to employers who start apprenticeship programs or who increase the number of apprentices beyond 80 percent of their recent levels. The Leveraging and Energizing America's Apprenticeship Programs (LEAP) Act would offer tax credits of $1,000 to $1,500 a year per apprentice for up to two years. Republican governors Scott Walker of Wisconsin and Nikki Haley of South Carolina are enhancing state efforts to increase the take-up of apprenticeship.

While stimulating interest among high-level policymakers is important, the hard part is achieving results in the labor market, especially by increasing the numbers of apprenticeships offered by employers. Increasing opportunities for skill development and mobility requires a strategy to move apprenticeships from an unusual activity to a mainstream approach to preparing for the workplace.

The European experience indicates the need to confront several questions, including:

- Should the apprenticeship expansion focus on youth, including high school students?
- What are the best ways to stimulate employers to hire and train apprentices?
- What mechanisms can create effective skill standards and maintain quality apprenticeships?
- What types of government financing are most cost-effective and appropriate for apprenticeships?
- What links should apprenticeships have with existing education providers?
- How can apprenticeships integrate effectively with higher education so that the links between apprenticeship training and universities are permeable?

Focusing on Youth

The youth focus of Germany and Switzerland conveys several positive lessons for the U.S. It improves the likelihood of government funding for academic courses related to apprenticeships. Given the consensus that the government should fund students through secondary school, paying for the related instruction of high school apprentices becomes a non-discretionary part of budgets. When apprentices are beyond high school, government funding for related instruction must come out of discretionary expenses. The European evidence demonstrates the feasibility of youth apprenticeships; youth are able to attain serious occupational competencies while completing secondary education. U.S. policymakers too often think youth should go through a pre-apprenticeship program before entering a fully-certified apprenticeship.

Apprenticeships in the late teenage years improve the non-academic skills of youth at a critical time. In

countries with little or no youth apprenticeship, structured work experience is less common, limiting the ability of youth to develop critical employability skills, such as teamwork, communication, problem-solving, and responsibility. Early apprenticeships can help engage youth and build their identity.[83] Apprentices work in disciplines that are interesting and new; they develop independence and self-confidence through their ability to perform difficult tasks. Youth try out new identities in an occupational arena and experience learning in a context of production, of making things.

From an economic perspective, apprenticeships for youth can be less costly for employers. Wages can be lower partly because youth have fewer medium and high wage alternatives and partly because youth have fewer family responsibilities, allowing them to sacrifice current for future income more easily. While Swiss firms invest large amounts of dollars in their apprenticeship programs, they pay their young apprentices very low wages during the apprenticeship period. Another economic advantage is that starting earlier in one's career allows for a longer period of economic returns to training.

Advising plays a critical role. European programs can use schools to provide a central location for advising and for helping young people seek apprenticeships. Because secondary schools reach nearly 100 percent of a cohort, coverage and cost-effectiveness are likely greater for youth than for adults. The advising takes place for nearly all students, which encourages learning from peers, and deals with real, high stakes choices rather than theoretical options.

Not all European systems are youth-oriented. The English apprenticeships cover a broad age group, with workers age 25 and over accounting for 37 percent of starts in 2013/2014. Some employers are less willing to take chances with teenagers than with workers in their 20s. They often prefer investing in apprenticeships for incumbent workers they already know. Occupational safety provisions may limit the ability of employers to hire youth, even as apprentices.

In the U.S. context, scaling apprenticeship with a youth focus is difficult for other reasons. Very few of the existing registered programs involve youth. The aversion to tracking students too early into an occupational sequence is a common objection to youth apprenticeship. Importantly, high school officials are generally averse to adding youth apprenticeship to their already extensive agenda, including implementing common core standards and school and teacher accountability standards and dealing with charter schools and vouchers. In the early 1990s, opposition to youth apprenticeship in the U.S. came from unions and others who worried about eroding the apprenticeship brand with less intensive training programs.

Still, given the European experience, the U.S. should incorporate a youth component into efforts at expanding apprenticeship. Currently, at least two U.S. states already operate apprenticeships at moderate scale. State government spending on youth apprenticeship programs amounts to about $3 million in Georgia and $2 million in Wisconsin. Although these programs reach only a modest share of young people, the U.S. could make a good start on increasing apprenticeship by building on the skill standards and other elements of these programs, including extensive advising, integration with high schools, and outreach to employers.

Engaging Employers

Of the three European countries highlighted in this paper, the most relevant for engaging employers is England. German and Swiss firms have long experience with and knowledge about apprenticeship; many managers and existing employees went through an apprenticeship. English firms were less familiar with modern apprenticeships until the late 1990s, when the government developed and started policies to attract employers into the apprenticeship system. Given the low familiarity with apprenticeship in the U.S. among employers and the general public, expansion will require an extensive marketing and technical assistance strategy.

In the case of England's major expansion, the government turned to a combination of national and local organizations. Among the national-oriented groups undertaking broad-based marketing are the National Apprenticeship Service and industry skill sector coun-

cils. At the firm level, the British government has been providing incentives to local training organizations and further education colleges to persuade employers to create apprenticeships. After developing apprenticeships with firms, the training providers and further education colleges receive funding for training outside the workplace. This funding is sufficient to encourage training providers to market apprenticeships to individual employers.

A similar model could be developed in the U.S. State governments could build a state marketing campaign together with incentives and technical support to community colleges and other training organizations to market apprenticeships at the individual firm level. However, simply marketing to firms through existing federal and state agencies may not work if the staff lacks the marketing dynamism, sales talent, and passion for expanding apprenticeship. Pay for performance is recommended: technical education and training organizations would earn revenue only for additional apprenticeships that each college or organization managed to develop with employers.

Every apprenticeship slot stimulated by the college/training organization increases the work-based component of the individual's education and training and reduces the classroom-based component. Assume the work-based component amounts to 75 percent of the apprentice's learning program and the school-based courses are only 25 percent of the normal load for students without an apprenticeship. By allowing training providers to keep more than 25 percent of a standard full-time equivalent student (FTE) cost provided by federal, state, and local governments in return for providing the classroom component of apprenticeship, the community colleges and other training organizations would have a strong incentive to develop units to stimulate apprenticeships. State and local governments could provide matching grants to fund units within technical training organizations to serve as marketing arms for apprenticeships. The marketing effort should encourage government employers as well as private employers to offer more apprenticeships.

South Carolina's successful example involved collaboration between a special unit within the technical college system devoted to marketing apprenticeship, and a federal representative from the Office of Apprenticeship. With a state budget for Apprenticeship Carolina 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. 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.

Determining Skill Standards and Maintaining Quality

Countries vary in their methods for creating skill standards. Germany and Switzerland undertake thorough analyses and involve social partners in developing national standards for occupations. Although national standards offer a compelling way of achieving credibility, transparency, and mobility, the failure of the National Skill Standards Board in the 1990s casts doubt on the ability of the U.S. to adopt such an approach.

Both England and the U.S. allow for a decentralized approach to skill standards. Within the U.S. registered apprenticeship system governed by federal and state law, companies list the individual competencies apprentices should devote a specified number of hours to master. The Office of Apprenticeship and/or State Apprenticeship Agencies approve the program for registration based on the list of competencies, referred to as "work processes." In general, these work processes are not developed through a lengthy, collaborative process involving government, groups of firms, worker representatives, and training providers. Although Labor Department regulations mandate that registered apprenticeships approved and operating within one state should be recognized in all other states, the standards are not uniform across the country or across firms. The ability of firms to create their own apprenticeship provides flexibility and speeds the approval process compared to waiting for a national committee to agree on a standard. On the other hand, the lack of national standards limits transparency and the mobility of workers.

One complicating factor is that not all U.S. apprenticeships, even formal apprenticeships, register with the U.S. Department of Labor (USDOL). Thus, were skill standards for registered apprenticeship to become more detailed and burdensome, firms could simply avoid registering. On the other hand, encouraging firms to use recognized standards will promote quality and transparency. To simplify the development of apprenticeship standards, a joint team from the Office of Apprenticeship and Department of Commerce could designate one or two examples of quality standards in consultation with selected employers who hire workers in the occupation. Once selected, the standards should be published and made readily accessible and designated as "safe harbor" standards such that employers who use these established standards would automatically be granted registered apprenticeship status. Workforce professionals trying to market apprenticeships would have a model that they can sell and that employers can adopt and/or make modest adjustments. Occupational standards used in other countries can serve as starting points to the Labor-Commerce team and to industry groups involved in setting standards and in illustrating curricula.

Already, the USDOL is learning from England's use of key firms in particular industries as "Trailblazers" who lead the process of defining occupations and developing standards. Designated as Leaders of Excellence in Apprenticeship Development, Education, and Research (LEADERS), the participating companies are expected to share innovative practices in their fields. In addition, they could lead the way in establishing apprenticeship completion standards.

Maintaining quality control of the system is difficult. Although the government undertakes audits of apprenticeships on occasion, programs in the U.S. are rarely subject to external party tests of those completing an apprenticeship. Some European countries designate non-profit bodies to assure all apprentices meet the appropriate qualifications; Germany relies on the local Chambers of Commerce to undertake this testing. As the U.S. scales up apprenticeships, the Departments of Labor and Commerce should collaborate to undertake pilots for determining the most cost-effective mechanisms for testing apprentices.

Financing Apprenticeships with Government Funding

Most apprenticeship programs in Europe and elsewhere pay all or most of the costs of the training outside the workplace, typically classroom instruction. England funds a large share of these costs, but the proportions vary by age; funding for related training is only about 50 percent of costs for apprentices over 25. As noted above, under a youth apprenticeship approach similar to what operates in Germany and Switzerland, the public sector within the U.S. could pay for off-job classes as part of the educational system's universal funding for all high school students. Emulating England would involve financing training through private training providers and community colleges based on the age of the apprentices.

Direct government subsidies to employers for other apprenticeship expenses (mostly wages of apprentices) are uncommon in European systems. In some industries in some countries, sector bodies levy fees on all companies in the industry to subsidize companies offering apprenticeships. In Switzerland, wage regulations permit employers to pay very low wages. England provides direct subsidies to small firms and firms just starting apprenticeship programs. A few states within the U.S. subsidize firms offering apprenticeships and subsidize classes at community colleges. Under the proposed LEAP Act noted above, the federal government would offer tax credits of $1,000 to 1,500 a year per apprentice for employers increasing their apprenticeships beyond 80 percent of the employers' initial number of apprenticeships.

Linking Apprenticeship with Education Providers

The European model relies heavily on publicly funded vocational schools (mostly at the secondary level) to provide related training to apprentices. England uses both public further education colleges as well as private training providers for this purpose. Switzerland is especially effective in making BA level education accessible to those completing apprenticeships. Apprentices can progress to Professional Education

and Training (PET) programs, with graduates able to compete with graduates of universities of applied sciences for highly technical and managerial positions. Learners find it relatively easy to switch between vocational, professional pathways and higher education. Germany and England have also been pushing for closer linkages between apprenticeship programs and universities.

One initiative begun in the U.S. is the Registered Apprenticeship-Community College consortium (RACC), a national network of postsecondary institutions, employers, unions, and associations working to create opportunities for apprentice graduates who may want to enhance their skills by ultimately completing an Associate's or Bachelor's degree. College members agree to provide credit for a Registered Apprenticeship completion certificate as recommended by a recognized third party evaluator. RACC will create a national network of colleges and Registered Apprenticeship programs aimed at helping apprentices complete postsecondary degrees.

Permeability of Apprenticeships with Higher Education Degrees

Several European initiatives aim to insure that apprenticeships integrate well with university BA programs. As noted above, the seamless way in which Swiss apprentices can enter universities is one reason Swiss apprenticeships are so popular. Efforts are under way in other countries to ease the transition from jobs after the apprenticeship into a university framework.

Until recently, U.S. registered apprenticeship programs have developed few linkages with higher education. One reason for the RACC initiative is that currently, U.S. apprentices rarely earn credit from their apprenticeships toward a two-year degree. To the extent apprentices have an easier time achieving a two-year college degree, through RACC or other initiatives, their path to a BA will become less difficult. However, such indirect linkages between apprenticeships and BA degrees are not the same as formal pathways with seamless linkages from apprenticeships through BA and graduate programs.

One rare, possibly unique, example of such a seamless approach is taking place between Old Dominion University and Newport News Shipbuilding.[84] Apprentices can become students at Old Dominion University and combine their four year apprenticeship with a BA degree in mechanical or electrical engineering. The apprentices spend a day or two per week in the classroom and the rest of their workweek on the job at Newport News Shipbuilding. A few universities, notably Temple and Northeastern, incorporate work-based learning into their BA programs but without formal apprenticeships.

Insuring permeability between apprenticeship training and university degrees is a worthwhile long-term goal, but one that emerges only with the expansion of apprenticeships. Still, it is not too early to try to begin taking steps to build the linkages between higher education and apprenticeships, certificates, and licenses that are increasingly common postsecondary credentials.

NEXT STEPS IN EXPANDING U.S. APPRENTICESHIP

The current resurgence of interest in apprenticeship in the U.S. is welcome news. The evidence is strong that adding a robust apprenticeship system in the U.S. can enhance skills and wages, reduce youth unemployment, raise economic mobility, increase the quantity and quality of middle skill careers, and strengthen the U.S. manufacturing sector. The experience of several European countries documents many of the benefits of apprenticeship systems and offers lessons for what a large system requires. Still, moving forward will be challenging. An initiative in the U.S. in the early 1990s to develop a major youth apprenticeship system faltered for a number of reasons.[85]

One quandary is that the existing U.S. apprenticeship system largely reaches adults with a median age of 25 and has no connections with high schools, while the most successful European models mainly cover youth in their late teen years and have close linkages with public vocational schools at the secondary level. Thus, in bringing apprenticeship to scale, the question becomes: which models of apprenticeship?

In dealing with this question, we can draw on the example of dramatic expansion of apprenticeship in England. The English approach involves giving preference to the youth side of apprenticeship while not excluding adults in many age groups. From a U.S. perspective, encouraging all types of apprenticeships, using a bottom-up approach, makes sense. As apprenticeships increase and attract more firms, employers and training partners will learn what works best. Already, in South Carolina, where the Apprenticeship Carolina initiative increased the number of firms offering apprenticeships from 90 to nearly 700 in the 2008-2014 period, several employers have encouraged the system to move toward a youth focus.

One way to provide incentives to promote apprenticeship at the youth level is to offer states incentives to replicate existing initiatives in Georgia and Wisconsin. Another is to encourage demonstrations with Career Academies, schools within high schools that have an industry or occupational focus. Over 7,000 operate in the U.S. in fields ranging from health and finance to travel and construction. These programs already include classroom-related instruction and sometimes work with employers to develop internships in fields ranging from health and finance to travel and construction. Because a serious apprenticeship involves learning skills at the workplace at the employer's expense, the academies would be able to reduce the costs of teachers relative to a full-time student. 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 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 to 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.

In any initiative, marketing will be critical. Jumpstarting a major expansion will require attracting large numbers of employers. England offers a good example for engagement. Alongside the National Apprenticeship Service and industry skill sector councils, the British government provided incentives to local training organizations to persuade employers to create apprenticeships. A similar model could be developed in the U.S. State governments could build a state marketing campaign together with incentives and technical support to community colleges and other training organizations to market apprenticeships at the individual firm level. However, simply marketing to firms through existing federal and state agencies may not work if the staff lacks the marketing dynamism, sales talent, and passion for expanding apprenticeship. Pay for performance is recommended: technical education and training organizations would earn revenue only for additional apprenticeships that each college or organization managed to develop with employers.

Finally, the European experience demonstrates the importance of information, research, and development. The U.S. government should sponsor an information clearinghouse, a technical assistance component, 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 U.S., 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.

U.S. policymakers and employers are beginning to recognize the desirability and feasibility of apprenticeship. Now, what is required is leadership at the policy and program levels and effective implementation to begin to scale up apprenticeships at both the youth and adult levels. Institutional change of this magnitude is difficult and will take time. But building a robust apprenticeship system offers a major opportunity for increasing earnings by raising the productivity of workers, enhancing occupation identity as well as career and job satisfaction, and expanding the middle class.

NOTES

1 William T. Grant Foundation, *The Forgotten Half: Pathways to Success for America's Youth and Young Families* (Washington, DC: William T. Grant Commission on Work, Family, and Citizenship, 1988) and Commission on the Skills of the American Workforce, *America's Choice: High Skills or Low Wages!* (Rochester, New York: National Center for Education and the Economy, 1990).

2 Andrew Sum, Ishwar Khatiwada, Mykhaylo Trubskyy, and Martha Ross with Walter McHugh and Sheila Palma, *The Plummeting Labor Market Fortunes of Teens and Young Adults* (Washington, DC: The Brookings Institution, 2014), <http://www.brookings.edu/~/media/Research/Files/Reports/2014/03/14%20youth%20workforce/BMPP_Youth_March10EMBARGO.pdf>.

3 Larry L. Orr, Howard Bloom, Stephen Bell, Fred Doolittle, Winston Lin, and George Cave, *Does training for the disadvantaged work? Evidence from the National JTPA Study* (Washington, DC: Urban Institute Press, 1996).

4 Peter Z. Schochet, John Burghardt, and Sheena McConnell, *National Job Corps Study and Longer-Term Follow-Up Study: Impact and Benefit-Cost Findings Using Survey and Summary Earnings Records Data* (Washington, DC: U.S. Department of Labor, 2006), <http://wdr.doleta.gov/research/FullText_Documents/National%20Job%20Corps%20Study%20and%20Longer%20Term%20Follow-Up%20Study%20-%20Final%20Report.pdf>.

5 U.S. Census, "Educational Attainment in the United States: 2014-Detailed Tables," 2014, <http://www.census.gov/hhes/socdemo/education/data/cps/2014/tables.html>.

6 Stephanie Cellini, "For-Profit Higher Education: An Assessment of Costs and Benefits," *National Tax Journal* 65:1 (2012): 153-180.

7 OECD, *OECD Employment Outlook: 2014* (Paris: Organization for Economic Development and Cooperation, 2014), 18.

8 David Bell and David G. Blanchflower, "Youth Joblessness" in *International Encyclopedia of the Social & Behavioral Sciences*, ed. James D. Wright, 2nd edition, Vol 25 (Oxford: Elsevier, 2015), 830–836.

9 David Autor, *The Polarization of Job Opportunities in the U.S. Labor Market: Implications for Employment and Earnings* (Washington, DC: Center for American Progress and the Hamilton Project, 2010), <http://economics.mit.edu/files/5554>.

10 Maarten Goos, Alan Manning, and Anna Salomons, "Job Polarization in Europe," *American Economic Review* 99:2 (2009): 58-63.

11 David Neumark, Hans Johnson, and Marison Cuellar Mejia, "Future skill shortages in the U.S. economy?" *Economics of Education Review* 32 (2013): 151-167.

12 Accenture, "Out of Inventory: Skills Shortage Threatens Growth for US Manufacturing," 2014, <http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture-2014-Manufacturing-Skills-Training.pdf>.

13 Claudia Goldin and Lawrence Katz, *The Race Between Education and Technology* (Cambridge, MA: Harvard University Press, 2008).

14 Douglas Webber, "Are College Costs Worth It? How Individual Ability, Major Choice, and Debt Affect Optimal Schooling Decisions," *IZA Discussion Paper* No. 8767 (2015), <http://ftp.iza.org/dp8767.pdf>.

15 OECD, *OECD Employment Outlook: 2014* (Paris: Organization for Economic Development and Cooperation, 2014).

16 Madeline Goodman, Robert Finnegan, Leyla Mohadjer, Tom Krenzke, and Jacquie Hogan, *Literacy, Numeracy, and Problem Solving in Technology Rich Environments Among U.S. Adults: Results from the Program for the International Assessment of Adult Competencies 2012: First Look* (Washington, DC: National Center for Education Statistics, 2013), <https://nces.ed.gov/pubs2014/2014008.pdf>.

17 OECD, *Education at a Glance 2013: OECD Indicators* (Paris: Organization for Economic Development and Cooperation, 2013).

18 OECD, *OECD Employment Outlook: 2014* (Paris: Organization for Economic Development and Cooperation, 2014).

19 Robert Lerman, "Expanding Apprenticeship Opportunities in the United States," in *Policies to Address Poverty in the United States*, ed. Melissa Kearney and Benjamin Harris (Washington, DC: Brookings Institution, 2014).

20 Robert Halpern, *The Means to Grow Up. Reinventing Apprenticeship as a Developmental Support in Adolescence* (New York: Routledge, 2009).

21 Ibid.

22 Kevin Hollenbeck, "State Use of Workforce System Net Impact Estimates and Rates of Return" (paper presented at the Association for Public Policy Analysis and Management (APPAM) Conference, Los Angeles, 2008), <http://research.upjohn.org/confpapers/1>.

23 Washington State Workforce Training and Education Coordinating Board, "2014 Workforce Training Results by Program," Olympia, WA (2014), http://wtb.wa.gov/WorkforceTrainingResults.asp.

24 Deborah Reed, Albert Yung-Hsu Liu, Rebecca Kleinman, Annalisa Mastri, Davin Reed, Samina Sattar, and Jessica Ziegler, "An Effectiveness Assessment and Cost-Benefit Analysis of Registered Apprenticeship in 10 States," *Final Report* (Washington, DC: U.S. Department of Labor, Office of Apprenticeship, 2012), <http://wdr.doleta.gov/research/FullText_Documents/ETAOP_2012_10.pdf>.

25 Robert Lerman, "Expanding Apprenticeship Opportunities in the United States," in *Policies to Address Poverty in the United States*, ed. Melissa Kearney and Benjamin Harris (Washington, DC: Brookings Institution, 2014).

26 Stefan Bauernschuster, Oliver Falck, and Stephan Heblich, "Training and Innovation," *Journal of Human Capital* Vol. 3, No. 4 (2009): 323-353.

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

28 Stephanie Cellini, "For-Profit Higher Education: An Assessment of Costs and Benefits," *National Tax Journal* 65:1 (2012): 153-180.

29 Council of the EU and the European Commission, "The Copenhagen declaration," 2002, <http://ec.europa.eu/education/pdf/doc125_en.pdf>.

30 Council of the EU (EU VET Ministers), European Commission, European Social Partners, "The Bruges Communiqué on enhanced European Cooperation in Vocational Education and Training for the period 2011-2020," 7 December 2010 and Council of the EU, "Council conclusions on education and training in Europe 2020: the contribution of education and training to economic recovery, growth and jobs," 27 December 2012.

31 CEDEFOP, "Lifelong guidance across Europe: reviewing policy progress and future prospects," *CEDEFOP Working Paper* No. 11 (Luxembourg: Publications Office, 2011), <http://www.cedefop.europa.eu/files/6111_en.pdf> and CEDEFOP, "Developing apprenticeships," *Briefing Note* (May 2014), <http://www.cedefop.europa.eu/files/9088_en.pdf>.

32 European Parliament and Council of the European Union, "Recommendation of the European Parliament and of the Council of 23 April 2008 on the establishment of the European qualifications framework for lifelong learning," *Official Journal of the European Union*, C 111 (6 May 2008), 1-7, <http://eur- lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:111:0001:0007:EN:PDF> and CEDEFOP, "Analysis and overview of NQF developments in European countries: annual report 2012," *CEDEFOP Working Paper* No. 17 (Luxembourg: Publications Office, 2013), <http://www.cedefop.europa.eu/EN/Files/6117_en.pdf>.

33 EUROSTAT, "Unemployment by sex, age and nationality," 2015, <http://ec.europa.eu/eurostat/web/products-datasets/product?code=lfsq_ugan>

34 Ibid.

35 Council of the EU, "Council declaration on a European alliance for apprenticeships," Luxembourg, 15 October 2013, <http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/lsa/139011.pdf>.

36 Dutch Ministry of Economic Affairs, "The Dutch Technology Pact," 2014.

37 CEDEFOP, "Attractiveness of initial vocational education and training: identifying what matters," *CEDEFOP Research Paper* No. 39 (Luxembourg: Publications Office, 2014), http://www.cedefop.europa.eu/EN/Files/5539_en.pdf.

38 CEDEFOP, *From education to working life: the labour market outcomes of vocational education and training* (Luxembourg: Publications Office, 2012), <http://www.cedefop.europa.eu/EN/Files/3063_en.pdf>.

39 CEDEFOP, "Developing apprenticeships," *Briefing Note* (May 2014), <http://www.cedefop.europa.eu/files/9088_en.pdf>.

40 Council of the EU, "Council declaration on a European alliance for apprenticeships," Luxembourg, 15 October 2013, <http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/lsa/139011.pdf>.

41 CEDEFOP, *From education to working life: the labour market outcomes of vocational education and training* (Luxembourg: Publications Office, 2012), <http://www.cedefop.europa.eu/EN/Files/3063_en.pdf>.

42 CEDEFOP, "Attractiveness of initial vocational education and training: identifying what matters," *CEDEFOP Research Paper* No. 39 (Luxembourg: Publications Office, 2014), <http://www.cedefop.europa.eu/EN/Files/5539_en.pdf>.

43 CEDEFOP, "Developing apprenticeships," *Briefing Note* (May 2014), <http://www.cedefop.europa.eu/files/9088_en.pdf>.

44 Michael Young and David Raffe, "The Four Strategies for Promoting Parity of Esteem," in *Strategies for achieving parity of esteem in European Upper Secondary Education*, ed. Johanna Lasonen and Michael Young (Jyväskylä: Institute for Educational Research, 1998).

45 BMBF, *Berufsbildungsbericht 2014* (Bonn: Bundesministerium für Bildung und Forschung, 2014).

46 CEDEFOP, "Germany – VET in Europe," *Refernet Country Report* (Luxembourg: Publications Office, 2012).

47 OECD, "Education at a glance. A country note (Germany)," 2014.

48 Martin Baethge, Christian Kerst, Michael Leszczensky, Markus Wieck, "Zur neuen Konstellation zwischen Hochschulbildung und Berufsausbildung," *Forum Hochschule* No. 3 (2014); BMBF, *Berufsbildungsbericht 2014* (Bonn: Bundesministerium für Bildung und Forschung, 2014).

49 BMBF, *Berufsbildungsbericht 2014* (Bonn: Bundesministerium für Bildung und Forschung, 2014).

50 CEDEFOP, "Germany – VET in Europe," *Refernet Country Report* (Luxembourg: Publications Office, 2012).

51 Ibid.

52 Ibid.

53 ILO and World Bank, *Towards a model apprenticeship framework. A comparative Analysis of national apprenticeship systems* (Geneva: International Labour Office, 2013).

54 CEDEFOP, "Germany – VET in Europe," *Refernet Country Report* (Luxembourg: Publications Office, 2012).

55 Eidgenössisches Department für Wirtschaft, Bildung und Forschung, "Berufsbildung in der Schweiz," 2014.

56 Mihaly Fazekas and Simon Field, "A Skills beyond School Review of Switzerland," *OECD Reviews of Vocational Education and Training* (Paris: OECD Publishing, 2013), <http://dx.doi.org/10.1787/9789264062665-en>.

57 Eidgenössisches Department für Wirtschaft, Bildung und Forschung, "Berufsbildung in der Schweiz," 2014.

58 Mihaly Fazekas and Simon Field, "A Skills beyond School Review of Switzerland," *OECD Reviews of Vocational Education and Training* (Paris: OECD Publishing, 2013), <http://dx.doi.org/10.1787/9789264062665-en>.

59 Eidgenössisches Department für Wirtschaft, Bildung und Forschung, "Berufsbildung in der Schweiz," 2014.

60 Felix Rauner, *Steuerung der beruflichen Bildung im internationalen Vergleich* (Gütersloh: Bertelsmann Stiftung, 2009).

61 OECD, "Learning for jobs," *OECD Review of Vocational Education and Training in Switzerland* (Paris: OECD Publishing, 2010).

62 Eidgenössisches Department für Wirtschaft, Bildung und Forschung, "Berufsbildung in der Schweiz," 2014.

63 Mihaly Fazekas and Simon Field, "A Skills beyond School Review of Switzerland," *OECD Reviews of Vocational Education and Training* (Paris: OECD Publishing, 2013), <http://dx.doi.org/10.1787/9789264062665-en>.

64 CEDEFOP, "UK – VET in Europe," *Refernet Country Report* (Luxembourg: Publications Office, 2013).

65 CEDEFOP, "Apprenticeship-type schemes and structured work-based learning programmes in United Kingdom," *Refernet* (Luxembourg: Publications Office, 2014).

66 CEDEFOP, "Apprenticeship-type schemes and structured work-based learning programmes in United Kingdom," *Refernet* (Luxembourg: Publications Office, 2014).; UK Government 2015).

67 CEDEFOP, "UK – VET in Europe," *Refernet Country Report* (Luxembourg: Publications Office, 2013).

68 UK Government, "Apprenticeships Policy," Standard Note, 20 March 2015.

69 Ibid.; UK Government, "Apprenticeships Statistics," Standard Note, 25 March 2015.

70 CEDEFOP, "UK – VET in Europe," *Refernet Country Report* (Luxembourg: Publications Office, 2013); ILO and World Bank, *Towards a model apprenticeship framework. A comparative Analysis of national apprenticeship systems* (Geneva: International Labour Office, 2013).

71 CEDEFOP, "Vocational education and training at higher qualification levels," *Research Paper* No. 15 (Luxembourg: Publications Office, 2011) and CEDEFOP, "Policy handbook - access to and participation in continuous vocational education and training (CVET) in Europe," *CEDEFOP Working Paper* No. 25 (Luxembourg: Publications Office, 2014), <http://www.cedefop.europa.eu/EN/Files/6125_en.pdf>.

72 CEDEFOP, "Vocational education and training at higher qualification levels," *Research Paper* No. 15 (Luxembourg: Publications Office, 2011) and CEDEFOP, "Germany – VET in Europe," *Refernet Country Report* (Luxembourg: Publications Office, 2012).

73 Felix Rauner, *Steuerung der beruflichen Bildung im internationalen Vergleich* (Gütersloh: Bertelsmann Stiftung, 2009); Eidgenössisches Department für Wirtschaft, Bildung und Forschung, "Berufsbildung in der Schweiz," 2014.

74 University of Warwick, "VET in Europe, country report UK," *Review of Apprenticeships Research* (Institute for Employability Research, 2013).

75 CEDEFOP, "Apprenticeship-type schemes and structured work-based learning programmes in United Kingdom," *Refernet* (Luxembourg: Publications Office, 2014).

76 Volker Rein, "Short Cycle Qualifikationen. Stellenwert im Bildungs- und Beschäftigungssystem in den USA und der EU," *Rahmenbedingungen, Qualifikationsgestaltung, Durchlässigkeit* No. 158 (2015).

77 BMBF et al.,*The German Qualifications Framework for Lifelong Learning* (Bonn: Bundesministerium für Bildung und Forschung, 2011).

78 Mihaly Fazekas and Simon Field, "A Skills beyond School Review of Switzerland," *OECD Reviews of Vocational Education and Training* (Paris: OECD Publishing, 2013), http://dx.doi.org/10.1787/9789264062665-en; Eidgenössisches Department für Wirtschaft, Bildung und Forschung, "Der europäische und nationale Qualifikationsrahmen (EQR und NQR)," Berufsbildung in der Schweiz,

2014.

79 Qualifications and Curriculum Authority et al., "Qualifications Frameworks in the UK," *Referencing Report* (2009).

80 Council of the EU (EU VET Ministers), European Commission, European Social Partners, "The Bruges Communiqué on enhanced European Cooperation in Vocational Education and Training for the period 2011-2020," 7 December 2010.

81 CEDEFOP, "Trends in VET policy in Europe 2010-12: progress towards the Bruges communiqué," *CEDEFOP Working Paper* No.16 (Luxembourg: Publications Office, 2012), <http://www.cedefop.europa.eu/ EN/Files/6116_en.pdf>.

82 Council of the EU, "Council declaration on a European alliance for apprenticeships," Luxembourg, 15 October 2013, <http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/lsa/139011.pdf>.

83 Robert Halpern, *The Means to Grow Up. Reinventing Apprenticeship as a Developmental Support in Adolescence* (New York: Routledge, 2009).

84 Paul Fain, "Student and Shipbuilder," *Inside Higher Ed.*, 6 April 2015, <https://www.insidehighered.com/news/2015/04/06/old-dominion-us-new-shipbuilding-apprenticeships-come-bachelors-degree>.

85 Robert Lerman, "Expanding apprenticeship in the United States: barriers and opportunities," in *Contemporary Apprenticeship: International Perspectives on an Evolving Model of Learning*, ed. Alison Fuller and Lorna Unwin (New York: Routledge, 2013).

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