Addressing America's Reskilling Challenge

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Executive Summary

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Renewed economic growth, a booming job market, and the evolving nature of work are transforming the face of the labor market, resulting in changes in the skill needs of American employers, as well as new and different opportunities for American workers.

In the United States, investment in skill development is largely "frontloaded" during the first 25 years of life. After that, public contributions to formal education are substantially smaller, and employer training represents the most sizable investment in further developing the skills of the American workforce. Restrictions on the use of Federal funds, which may have been appropriate when specific programs were designed to address the labor market challenges of another era may not be optimal for the future reskilling challenges, especially those linked to trade and technological change.

Additionally, there is an information gap between employers, workers, and educational institutions. While employers presumably know which skills they value in an employee, workers themselves and educational institutions have less up-to-date knowledge, and their response lags behind the changing demand. Lacking incisive data, workers and educational institutions are separated from employers by an information gap that makes it difficult to prepare the workforce with the skills employers seek. The information gap is exacerbated by a dearth of data and weak comparability of skill requirements. Coordination among these parties will be crucial for addressing America's reskilling challenge.

1. Introduction

The most important economic objective of the Trump Administration has been to return the economy of the United States to a full-employment economic growth path of 3 percent per year, improving the employment prospects and economic well-being of all Americans. Due in large part to unprecedented reductions in regulations affecting virtually every major industry and occupation, and to the passage of the 2017 Tax Cuts and Jobs Act which reduced the corporate tax rate from 35 to 21 percent, this goal could likely be achieved in 2018.

The U.S. economy experienced strong and significant growth acceleration in 2017, with growth in real GDP exceeding expectations and increasing from 2.0 and 1.8 percent over the four quarters of 2015 and 2016, respectively, to 2.6 percent in 2017. In 2017, the unemployment rate fell to 4.1 percent, the lowest rate since December 2000, and ended the year 0.6 percentage point below its rate 12 months prior. Moreover, in 2017, the economy added an average of 182,000 jobs per month, amounting to nearly 2.2 million new jobs in total. Newly released estimates of GDP growth in the first quarter of 2018 suggest this momentum will continue.

Thus 2017 marked a nontrivial trend shift. To sustain the momentum, it will be necessary to return the economy to pre-Great Recession employment-to-population ratios and labor productivity rates. To do so will take more than simply lowering the unemployment rate beyond May 2018's 3.8 percent level, which ties the lowest unemployment rate since 1969. There simply are not enough unemployed workers in the current pool of those looking for work to match the growth in demand for new workers unleashed by the Trump Administration's pro-growth policies. Rather, employment gains must also come from working-age Americans returning to employment from the sidelines. Labor force non-participation among prime-age individuals — defined by the Bureau of Labor Statistics (BLS) as 25 to 54 — is substantially higher among workers without a college degree, and future efforts may need to be directed at this demographic.

Not only will a booming economy require more Americans to enter the labor force, it will also likely require workers with a different set of skills. As aging baby boomers retire, job openings will become available to younger workers. More importantly, the skill requirements of an economy that continues to evolve quickly are likely to be different from current ones. The rise of artificial intelligence and other sources of work automation have sparked concern regarding the implications for American workers. The National Academies of Sciences, Engineering, and Medicine (2017) notes that the continued advance of information technology implies "workers will require skills that increasingly emphasize creativity, adaptability, and interpersonal skills over routine information processing and manual tasks."

Even if job creation outpaces job destruction in the years ahead, the skills required in newly created jobs will be different from those in jobs eliminated by automation. The OECD and other sources suggest that workers without a college degree are the most likely to be affected by this disruption (McKinsey 2017, OECD 2018, PWC 2018).[1] Automation is just one example of something that can change how workers' skills are valued. Some of the skills accumulated by workers are specific to a region, industry, or place of business. Changes in the marketplace can reduce the need for these skills, and a displaced skilled worker has to accept a lower-paying position that does not utilize all of the skills he had accumulated (Couch and Placzek 2010).

In addition to helping more workers adapt to a rapidly changing job market, addressing America's reskilling challenge is crucial for enabling workers to access the best opportunities available. In general terms, the supply of skills has not yet caught up with the demand, preventing some workers from attaining higher wages or more rewarding positions. The premium paid to high-skilled workers has increased over the past 40 years (Neelakantan and Romero 2017). Young people have responded to this, for example, by attending college at historically high rates. However, the additional college attendance has not always translated into completion of a degree. If the student ends up departing school before completion, their investment has not paid off as much as it could have had they graduated. Sometimes the pre-college academic preparation is inadequate; in other cases; high college tuition is a barrier to graduation.

Individuals, employers, and other private entities, including education institutions, each have a stake in confronting this issue. There are public incentives for policymakers to take on this issue as well. In this report, we identify the motivations and limitations of each of these groups in addressing the reskilling challenge, while documenting the current contributions of each to America's reskilling activities. Our analysis highlights the challenges new reskilling investments would need to overcome, and we emphasize the information challenges facing heightened investments in reskilling programs as well as the financial challenges facing workers seeking to retrain. We conclude by offering several case studies of reskilling models for consideration.

The report also provides original estimates of reskilling investments by public entities, private households, and America's employers over the life cycle. Our estimates show that a high school graduate in the United States can expect to receive approximately $26,000 in employer-provided skills training over the course of his or her prime working years, approximately half what someone with a bachelor's degree might expect to receive. Despite hefty investments in

[1] In a March 2018 report, the Organisation for Economic Co-Operation and Development (OECD) estimates that approximately 14 percent of jobs in OECD countries are at risk of loss to automation, while the tasks performed in an additional 32 percent of jobs may change substantially. While informative, that report was not able to account for market adjustments such technological changes.

formal education for the population aged 3 to 21, public investments in adult education spending taper substantially after age 25, falling near to zero by age 40. The current structures of reskilling support may well adapt to tighter labor markets and to worker displacement from an increased pace of technological change. However, these estimates highlight the current state of investment and the need to renew coordination between the relevant entities in American reskilling.

2. The Key Players

At least four parties are involved in American reskilling efforts: individuals, employers, private institutions, and public entities (Federal, State, and local). In this section, we review the motivations and constraints of each party.

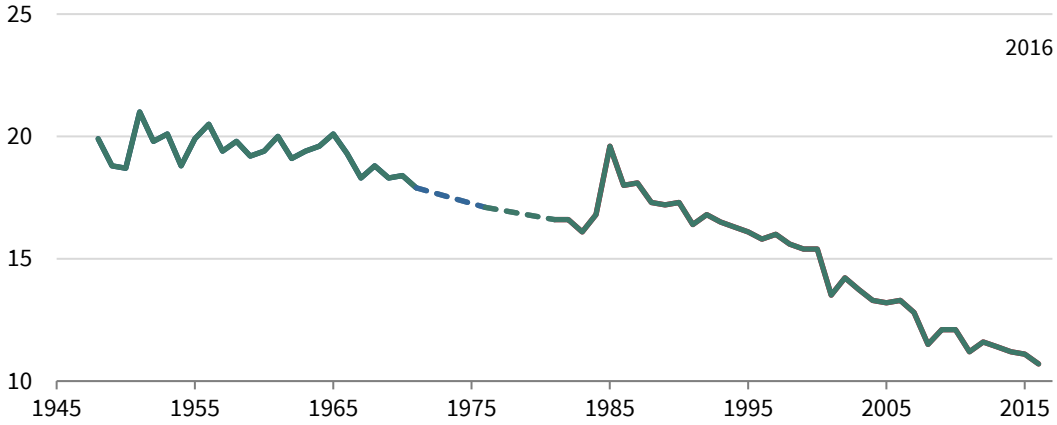
A. Individuals stand to gain from successful reskilling efforts, but face information and financial challenges

Individuals may pursue reskilling opportunities for a variety of reasons and may do so even without a nudge from job displacement. However, the impetus to pursue reskilling is heightened by job loss. Newly unemployed individuals may find that their skills are regarded less applicable, or less valuable, in a rapidly evolving labor market.

Skill-upgrading as a route to re-employment has taken on renewed importance over the past several decades as the geographic mobility of Americans has declined (Figure 1). There may be many different reasons for the decline in geographic mobility, but the implication is that workers who do not find local job opportunities matching their current skill sets have become less likely to relocate to find opportunities matching those skills, and more likely to either remain unemployed or to acquire skills that match local labor demand. The supplemental survey on displaced workers that accompanies the Current Population Survey (U.S. Bureau of Labor Statistics) indicates that Americans who lost a job between 2005 and 2015 were over four times more likely to change industries upon re-employment than to move following their displacement (Figure 2). Skill adjustments to match the local labor market, then, are a critical element of the re-employment efforts of displaced workers.

Figure 1. Share of U.S. Residents Who Moved During the Past Year, 1947–2016

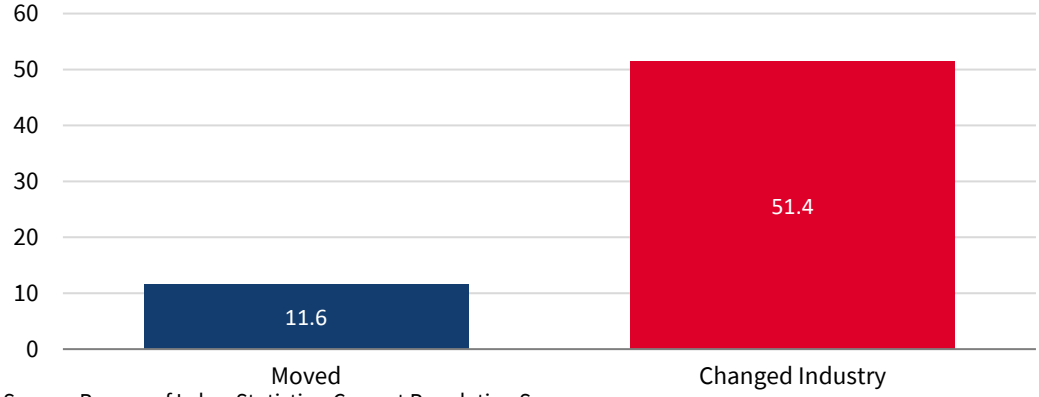
Percentage of U.S. residents



Source: U.S. Census Bureau.
Note: The one-year geographic mobility question was not asked between 1972 through 1975 and 1977 to 1980, so the value is interpolated.

Figure 2. Share of Displaced Workers Changing Industry or Location, 2005-2015

Percentage of Workers



Source: Bureau of Labor Statistics, Current Population Survey.
Note: Industries included are 11 broad categories from Census 1990 industrial classification code.

Displaced workers who successfully retrain to meet demand in their local labor market stand to experience substantial financial returns. Thus, the private financial incentive to retrain is strong. However, the effects of social safety net policies can complicate this dynamic. Social safety net policies designed to assist Americans facing job displacement do not always

promote work or encourage self-sufficiency. Instead, such programs can discourage economic independence, an issue the Trump Administration seeks to address.

Individuals displaced from employment may not retrain for a number of reasons, even when it is in their financial best interest. First, displaced workers may have limited budgets, making it more difficult to fund skilling efforts while maintaining the financial stability of their households. These constraints may be heightened in the future: several estimates of the incidence of automation suggest that workers with fewer years of education (who are likely to have lower incomes) are more likely to see their jobs changed substantially by automation (McKinsey 2017, OECD 2018, PWC 2018). Thus, job loss may disproportionately affect those least able to afford tuition costs of reskilling programs up front, and least likely to be able to sustain a forfeiture of labor income for the duration of the reskilling period.

Second, displaced workers may face an information gap regarding jobs available in their local labor market, the skills required for those jobs, and training programs that can best equip them with those skills. The expansion of online job aggregators has greatly facilitated the search for job openings, but it has not necessarily assisted workers in deciphering the skills required for these jobs and the specific training steps needed to meet those requirements. We discuss the information challenges facing workers later in this report.

Finally, workers may not retrain because they are overly confident about the likelihood of their own re-employment (Spinnewijn 2015). In this case, providing additional information to workers about their re-employment prospects in local labor markets with and without retraining would allow them to make more informed decisions regarding reskilling investments.

B. Employers have incentives to train workers to meet their skill needs, but also fear newly trained workers will be hired away

Employers have incentives to recruit and train the labor force they need, particularly in a tight labor market. However, if employers are concerned that they will train a worker, only to lose them to a rival, they will be reluctant to invest. Economists distinguish between general and specific human capital; general human capital includes the set of skills workers obtain that can be applied to multiple firms, while specific human capital is more narrowly applicable to a single firm or a narrow set of firms. For example, learning a proprietary computer system would be specific human capital, while capabilities in a ubiquitous programming language would constitute general human capital. From an employer's perspective, spending on specific human capital is a safer investment, as it is less likely to lead to an increase in outside opportunities for workers who receive the training. However, not all skills gaps can be bridged

with specific human capital, suggesting that employers individually may not have the financial incentive to bridge the gap between the skills they require to be globally competitive and the skills the U.S. workforce possesses.

C. Taxpayers have a stake in successful reskilling, and Federal, State, and local governments may be important contributors to resolving the information gap

Public participation, financial and otherwise, in the reskilling of workers may be appropriate for several reasons. First, although workers who successfully re-employ will reap the majority of the financial benefits of re-employment, those benefits do not accumulate solely to workers. The public stands to benefit from successful re-employment as well, both because it increases public tax revenues and because it reduces reliance on social safety net programs.[2] Moreover, persistent unemployment can have follow-on effects for local communities, including a potential link to opioid use, as well as intergenerational effects (such as decreased income) on the children of displaced workers (Charles et al. 2018; Oreopoulos et al. 2008; Stevens and Schaller 2010).

Many of these same considerations drive other public workforce investments: ensuring access and funding for students through grade twelve, partially financing post-secondary education, and providing quality metrics to guide students to successful post-secondary programs. Reskilling, in some ways, fits into a portfolio of public investments in education and workforce development already in place. Federal, State, and local governments in the United States have historically spent far less on such active labor market policies (such as public expenditures on retraining as well as on job counseling and job search assistance, as defined by the OECD), measured as a share of gross domestic product (GDP), than other developed countries. Thus, the information in Figure 3 demonstrates the spending on all programs designed to assist workers with re-employment, not just reskilling. Still, it is clear that the $50 billion the United States spent on these efforts in 2016 is less than most of the developed world, especially as measured as a share of GDP. Of course, public expenditures are not the goal, nor are inputs the correct metric; funding decisions should be made based on cost-benefit assessments as well as an understanding of the gaps in private labor market expenditures.[3]

Beyond assistance to those displaced, other public investments can encourage reskilling. For example, the National Science Foundation's Advanced Technological Education Program

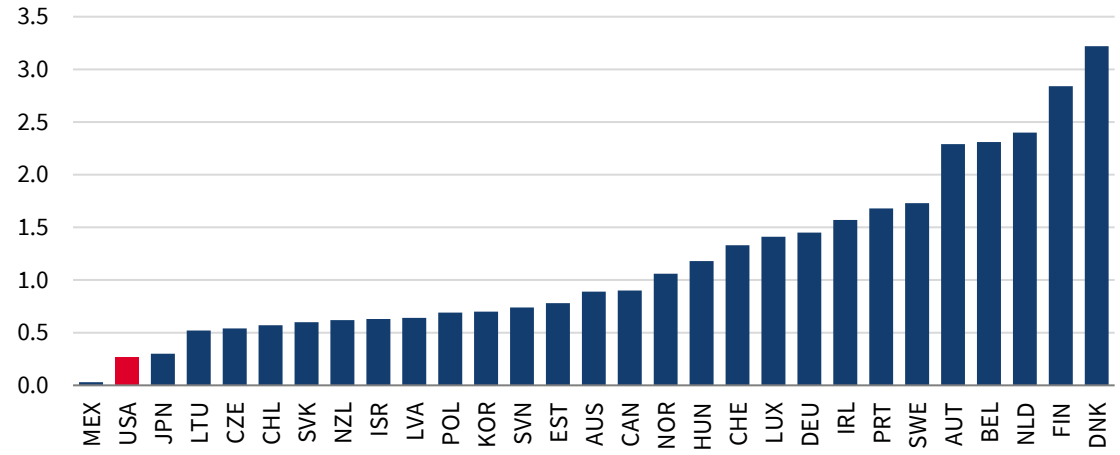
[2] However, we note that workers forgo earnings as they acquire skills, which means that for a time the Treasury forgoes tax revenue and might spend more on safety-net programs. This also means that minimum (cash) wage laws may act as a barrier to skill acquisition (Hashimoto 1982; Neumark and Wascher 2003).
[3] Several European training programs do not pass the cost-benefit test (Kluve 2010; Card, Kluve, and Weber 2010).

awards grants to two-year community colleges that have partnered with local industry to provide technician training. There are active awards in 45 U.S. States and the District of Columbia, and 2018 awards totaled almost $348 million.[4]

For private reskilling efforts to succeed, workers must have a sense of the gap between the skills they possess and those demanded in the labor market. At present, the United States does not systematically gather data on the skills gap. Moreover, given the reduction in geographic mobility, the most relevant skills gap for workers to understand is the local skills gap, which is even more opaque. If the Federal government could address this information gap on the part of workers and employers, it would enable the successful matching of workers to jobs, and the matching of workers' retraining efforts to employers' needs. Federal capabilities may, however, be enhanced by the private sector, which is already gaining traction in the standardization of job postings. We discuss these issues in more detail in the next section.

Figure 3. Public Expenditure on Active Labor Market Programs, 2016

Percent of GDP



Source: OECD Statistics.

D. Other private organizations may also make valuable contributions to meet the reskilling challenge

Private organizations play an important role at the state and local level in assisting the job search and reskilling of displaced workers. For example, the Building Industry Group Skilled Trades Employment Program (BIG STEP) is a Wisconsin-based nonprofit organization that

[4] All states are represented except Vermont, New Hampshire, West Virginia, Mississippi, and Wyoming.

offers tutoring, counseling, training, and apprenticeship preparation to individuals seeking a career in the construction industry. BIG STEP is funded by private donations — which help cover the costs of tutoring, textbooks, apprenticeship placement services, and so on — and has received support through foundations and Federal grants. While BIG STEP's services are not restricted to displaced workers, an assessment by the OECD suggests that there is room for the organization to grow in that space and that it could offer worker training programs at the local level even more effectively with Federal backing and encouragement.

Platform to Employment (P2E) is another example of a nonprofit dedicated to assisting workers facing barriers to employment. P2E supports workers' training and offers placement in a paid eight-week employment program. The program reports the successful employment of 72 percent of those who successfully complete the preparatory program. Though initially based in southwest Connecticut, P2E received state funding in 2014 to expand statewide, and has branched into Chicago, Dallas, and San Francisco.

Labor unions can also serve as a resource to displaced workers looking to gain skills for a new profession. The United Mine Workers of America (UMWA), for instance, provides retraining services to displaced coal miners through its Career Centers. With the assistance of State and Federal grants, UMWA Career Centers offer a variety of services to qualified displaced coal workers. These services range from skills training to resumé-building to job search and placement.

3. Summary Measures of Education and Training Expenditures Across the Life Cycle

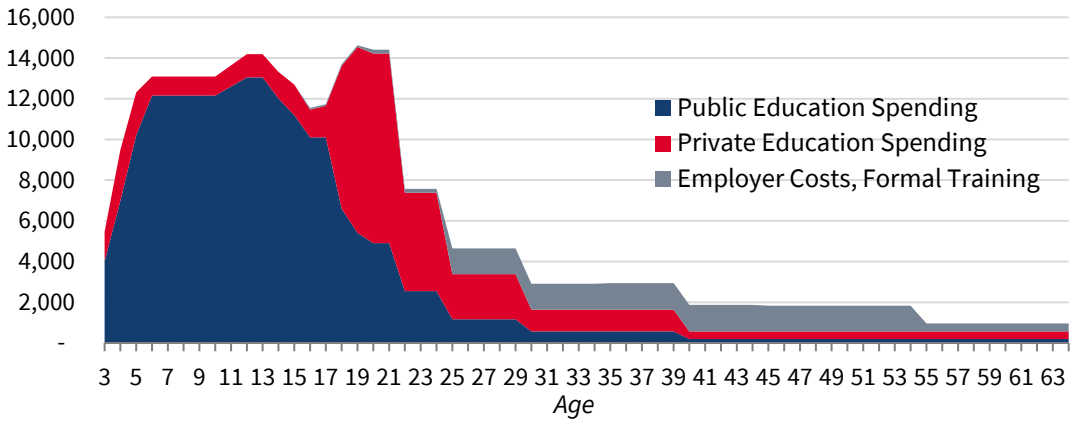
To measure American investments in skill development, we incorporate estimates of both formal education expenditures and training expenditures outside of the classroom. Figure 4 contains original estimates of average spending on education and training across the course of an American's life. Education expenditure estimates incorporate standardized data captured by the OECD on public and private expenditures on early childhood education as well as primary, secondary, and tertiary education. The estimates include expenditures on post-secondary programs that do not grant degrees, and experienced workers who return to school later in their careers are captured in these data.

Employer costs of formal training in Figure 4 are based on extrapolations of independent survey responses produced by a training industry trade group and calculations by the Georgetown University Center on Education and the Workforce (Association for Talent

Development 2017; Carnevale et al. 2015).[5] Both sources indicate American employers spent approximately $180 billion to $200 billion on employer-provided formal training for workers in 2017, and Carnevale et al. calculate 16 percent was spent on tuition assistance. In addition, employers spent approximately $27 billion on apprenticeship costs. These training expenditures are not limited to new employees but also reflect spending to maintain skills workers already possess or to provide current workers with additional capabilities. These estimates do not include informal workforce training, wherein workers "learn by doing" or learn new tasks informally from work colleagues. Some estimates suggest that the value of these informal training opportunities is more than twice that of formal training. For the purpose of this exercise, we account for employer-funded tuition as part of private education spending rather than as part of formal training paid for by employers.

The age distribution of participants in education and training programs is estimated based on data provided by the OECD, by the U.S. Census Bureau, and by Carnevale et al. (2015). Spending by employers on formal skills training is concentrated among prime-age workers, with 86 percent going to workers between the ages of 25 and 54.

Figure 4. Expenditures on Education and Skills Training, by Age and Source



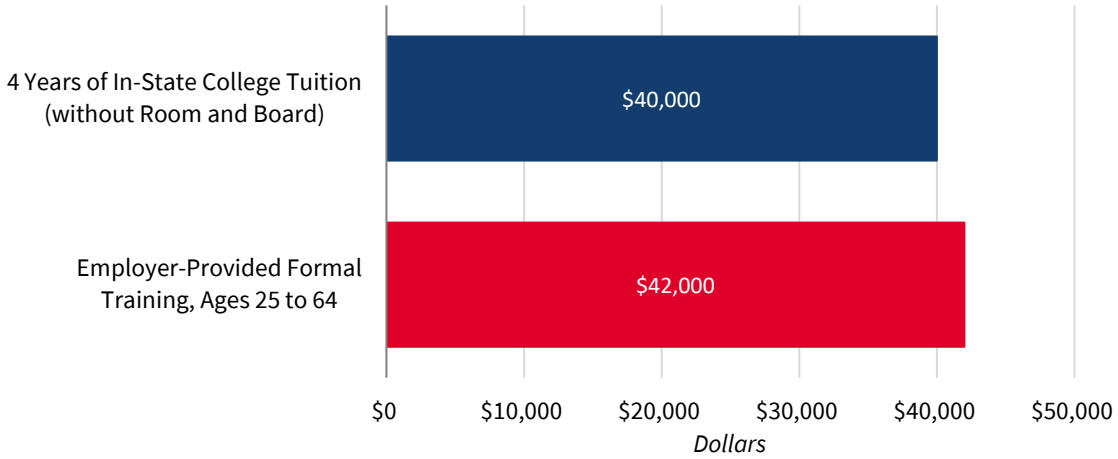
Sources: OECD, U.S. Census Bureau, BEA, BLS, Association for Talent Development (2017), Carnevale et al (2015), CEA Calculations.
Note: Age distribution of education and training participants estimated based on data from sources above as

[5] The employer costs of employee training estimates available in the literature are of much lower certainty than the education spending figures from the OECD. The Association for Talent Development results are based on survey data where survey respondents may not be representative of all employers. The Carnevale et al. (2015) results are based on a model that seeks to bring Federal survey data "forward", relying on survey data last collected in 1995 and projecting forward based on changes in the occupation and industry composition of the U.S. economy in the interim. Both approaches are reasonable given the dearth of data, but the resulting estimates should be viewed with caution.

The combined estimates suggest that investment in education is high during the elementary school to early high school years and again during the traditional college years between 18 and 21. By age 22, both public and private contributions to education spending fall precipitously while employer investments in formal training have not yet begun to rise. By the time workers reach prime working age, employers spend roughly $1,300 per year on employee training. While a sizable sum, it is less than 10 percent of the total amount spent by private and public parties on education at age 18. On average, based on the information in Figure 4, workers will benefit from an estimated $42,328 in employer expenditures on formal training between ages 25 and 64—roughly the cost of in-state tuition and related fees for 4 years at a public college (before room and board, see Figure 5).

Workers with a high school diploma or less are far less likely to receive employer-provided formal training. Employer spending on these workers is also likely to be lower. The most recent data available, as summarized in Lerman (2013), indicate that more than 25 percent of employed 25- to 64-year-old workers with a bachelor's degree participated in training in the previous 12 months compared to roughly 5 percent of those without a high school diploma and 13 percent of those with a high school diploma only. These ratios suggest employer spending on the training of workers with a high school diploma only may be closer to $26,000 across their work-life from 25 to 64, roughly equivalent to two years of middle school education costs.

Figure 5. Cost Comparisons for Employer-Provided Formal Training and In-State Public College Tuition and Fees



Sources: U.S. Census Bureau, BEA, Carnevale et al (2015), CEA Calculations, The College Board.
Note: In-State tuition estimate based on average total cost for 2017-2018.

4. What Are We Training For? The Information Problem in Reskilling Efforts

A popular point of view is that America faces a skills gap. The most recent estimates from the Bureau of Labor Statistics suggest there were in excess of 6.6 million unfilled job vacancies in the United States as of May 2018. Presumably, these vacancies remain unfilled in part because there are few unemployed workers in today's tight labor market, but also because today's unemployed workers and those currently not in the labor force do not possess the skills required to fill these job openings. Workers currently considering retraining investment would do well to match their courses of study to the needs of employers and pursue high-quality programs that could lead to precisely the skills and credentials employers seek. Moreover, public investments in education institutions, including both grants and student aid, and the investments of these institutions in their own programming, could be more effectively directed toward the current skills gap if more specific information were available about the nature of the gap.

A. Unmet skill demand in the U.S. labor market is not systematically measured

Directing investment toward the extant skills gap is far easier said than done. There is no systematic method by which the Federal government measures skills gaps at any geographic level.[6] Broadly speaking, BLS is the primary source for labor market data. Although BLS does track job vacancies in its job openings and labor turnover statistics (JOLTS) series, details about current vacancies in the JOLTS data are limited to the industry in which the firm operates. Every two years, BLS creates ten-year projections of employment and job openings by occupation based on models of occupation growth and retirement behavior, but BLS does not model what share of those projected jobs might go unfilled. (Like most economists, BLS statisticians assume wages will rise and fall and workers will retrain and shift so that there are no worker shortages within occupations in the long run). No corresponding measure of worker skills is available to compare to the characteristics of job openings.

Moreover, a skills gap analysis that could guide implementation of retraining programs would need to be sensitive to the local economy in which a displaced worker resides or wishes to reside. Even when nationwide skills gaps are identified, as is the case for cybersecurity workers, the spatial mismatch between workers and jobs remains unknown (Zadelhoff 2017). And, as

[6] The U.S. Department of Education does support the OECD's Programme for International Assessment of Adult Competencies, which is a comprehensive survey of broad skill categories. The survey's results are not at a level granular enough to illuminate occupation-specific skills gaps (e.g., cybersecurity skills).

mentioned above, U.S. workers are increasingly geographically immobile, necessitating a local labor market emphasis in any skills gap metric.

B. The private market and public–private partnerships are making some headway

Perhaps more promising sources of data on employer skill requirements (and their geographies) are online job posting aggregators such as Glassdoor, Burning Glass, Indeed.com, and EMSI/CareerBuilder. Data from these sites that can be accessed with an active subscription provide measures of job openings alongside their detailed location, skill requirements, education requirements, pay rates, and employers. Some of these aggregators market their capabilities toward local economic and workforce development clients, including community colleges and community development organizations. An example of such an online job search tool is outlined in Box 1 below.

In general, job seekers can access these aggregators free of charge and search for available jobs in their area. However, job openings do not translate straightforwardly into retraining paths, in part because job titles do not always match required skills or relevant degree and certificate programs. An April 2016 review of these aggregator sites in the *Wall Street Journal* (*WSJ*) elucidates the issues through an interview with the dean of Macomb Community College, which has traditionally served Michigan's auto industry (Sussman and Korn 2018). According to the authors, "When the school's engineering dean examined thousands of local job listings, he learned manufacturers used dozens of job titles for the same mix of skills Macomb calls mechatronics—a combination of mechanics, electronics and programming."

Box 1: Burning Glass/U.S. Department of Commerce Collaboration

Cybersecurity professionals are becoming a vital part of the economy as the United States faces expanding, and increasingly costly, cyber risks. In a 2018 report, the Council of Economic Advisers estimates that adverse cyber activity cost the United States up to $109 billion in 2016 alone.

Accordingly, both the public and private sector have increased their demand for cybersecurity workers, and the industry is facing a dearth of workers to fill open positions. Between October 2016 and September 2017, over 280,000 cybersecurity jobs were posted in the United States and the ratio of workers to openings in cybersecurity was only 2.6 compared to 5.6 for all jobs nationwide. Job postings requiring cloud security skills stay open for an average of 96 days, longer than jobs requiring any other IT skill.

A new tool called CyberSeek seeks to address this skills gap. CyberSeek was introduced by the U.S. Commerce Department's National Institute of Standards and Technology (NIST) in November 2016. The tool is organized like a heat map; it colors different areas of the country by the demand for cybersecurity employees in that area. Users can search by State or metropolitan area to see the

total number of job openings in that area, worker supply and supply/demand ratios, and the area's top cybersecurity careers by title.

CyberSeek is unique in that it combines the expertise of private and public entities to address a skills gap. CompTIA, a non-profit trade association for professionals in IT, partnered with Burning Glass Technologies to provide information on job postings and labor demand. Labor supply data (measured as those currently employed) are sourced from the BLS. For its part, NIST provides a standardized workforce framework for the cybersecurity industry that delineates the skills needed to perform a cybersecurity job and a method by which to standardize job descriptions and training certificate requirements. NIST's work "establishes a taxonomy and common lexicon that describes cybersecurity work and workers irrespective of where or for whom the work is performed," and the framework is designed to be used by private firms, academia, and the public sector. CyberSeek was started with a first-year grant of $249 thousand from NIST and, recently, second-year funding of $110 thousand to expand the project's capabilities.

If successful, the project would result in increased awareness of the career opportunities in cybersecurity, by geography and specific skill requirement. This transparency could result in a better-directed labor supply, which would help both employers and workers. If so, public support would have contributed to a better-functioning labor market, returning many of the benefits of employment highlighted earlier. Moreover, the public sector is a major employer of cybersecurity workers and would benefit from an expanded labor force in this way as well.

The standardization problem highlighted by the *WSJ* may be acutely American, a result of higher economic dynamism and no organized standardization of job listing formats as is present in other countries. Even BLS, which publishes vacancies for the United States as a whole, does not attempt to measure the specific skill requirements of these vacancies. Some U.S. States have attempted to improve information flows by publishing their own summaries of job postings from aggregators, including an attempt to translate job postings into skill requirements. For example, a Missouri program responds to mass layoffs by providing job vacancy information from Burning Glass tailored to a displaced worker's skill set and likely geographic mobility. More advanced State-based programs provide workers with recommended pathways to develop the skills sought by employers.

Private industry is also attempting to improve standardization across job postings. Schema.org, a website co-founded by Google, Microsoft, Yahoo, and Yandex, creates and promotes "schemas" enabling data available on the internet to be presented in a more structured and organized manner. Though the host website does not cater specifically to job openings or job seekers, it offers shared vocabulary to benefit webmasters, search engines,

and users. A schema for a job posting, for example, contains shared coding suggestions for occupational categories, qualifications, and skills required.

Colorado's "Skillful" initiative is also showing promising early signs. In 2016, the technology-focused Markle Foundation launched this statewide job skills program aimed at advancing "middle-skills jobs," such as IT or advanced manufacturing, by connecting employers, State and Federal government, educators, businesses, and other key labor market players. Skillful caters to American workers who have been displaced by technological change or who lack a four-year degree and therefore face more difficulty in job transitions. With the support of Microsoft, LinkedIn, the State of Colorado, and local partners, Skillful has become an information hub for job seekers, education institutions, and employers. Skillful offers coaching and other online services to help individuals assess the value of educational or training programs, assisting individuals in determining which skills are in high demand in a specific location. Moreover, the information collection makes it possible for education institutions to better design academic programs to meet labor demand, and these tools help local employers determine the available skillset in a given area. In June 2017, Microsoft Philanthropies announced an almost $26 million investment in Skillful which would accelerate the workforce training program's expansion into nineteen states beyond Colorado.

5. Addressing the Financial Challenges of Reskilling Workers

While some unemployed individuals may be able to tap into personal savings or access public support to cover personal expenses while they pursue retraining opportunities, managing both education and household living expenses with a reduced income may be a strong deterrent to pursuing retraining, especially among older workers who are more likely to be fully financially independent. As such, these workers may choose an opportunity that provides immediate income—even if it is at a reduced rate relative to their previous employment—if it can be achieved without the delay of retraining. This choice may meet the immediate needs of the worker and his or her family, although it may not be the most lucrative choice over the long run. Some workers prefer to maintain their full income while pursuing new skills, choosing to enroll in school while maintaining full-time employment—despite full-time employment being a risk factor for non-completion (Institute for Research on Higher Education 2016).

A. Apprenticeship models help bridge both an information gap and a financial gap for workers

Some reskilling models meet the budget constraints of displaced workers better than others do. In particular, apprenticeships and other work-based learning opportunities provide a financial bridge so workers earn a wage during their training and do not face the personal

expenditure outlays needed to enroll in formal education. Apprentices and those participating in other types of work-based learning undertake productive work for an employer, earn wages, receive training primarily through supervised, work-based learning, and may periodically take relevant classroom courses to earn an industry-recognized credential. Moreover, apprenticeships bridge the information gap in reskilling by allowing a worker to sign on to a company without knowing what specific skills are needed, thereby forgoing the need to obtain skill-development information. Additionally, apprenticeships have been shown to provide a strong boost to workers' future labor market outcomes (Neumark and Rothstein 2005, Lerman 2014). Despite these advantages, those undertaking apprenticeships make up less than 0.5 percent of the U.S. labor force, compared to roughly 2 to 4 percent in Australia, Britain, Canada, and Germany.

Some states have shown recent progress in supporting apprenticeships and work-based learning opportunities; for example, collaboration between South Carolina's technical college system and the U.S. Department of Labor stimulated a ten-fold increase in apprenticeship programs in the state since 2007. Through a work-based learning model, the program aims to train maintenance technicians. Toyota partners with local community colleges to offer a two-year work-study course for which students attend class two days a week. On the other days, students intern at a Toyota factory or an area manufacturing company gaining hands-on experience in maintenance and production.

Through this paid internship, students can earn as much as $40,000 over two years, improving the feasibility of graduating without debt. Those who complete the program obtain an associate's degree of applied science in advanced manufacturing and earn access to opportunities for additional training, other paid internships, and a full-time job with Toyota. While program graduates are not guaranteed a job at Toyota (both the business climate and student performance can affect employment opportunities with the company), those hired by an AMT partner firm can earn as much as $64,000 a year in addition to benefits.

The President has renewed the focus on apprenticeships and work-based learning with a June 2017 Executive Order focused on expanding access to apprenticeship through establishing new Industry-Recognized Apprenticeship Programs developed by third parties. The EO also directed Secretary of Labor Alexander Acosta to establish a Task Force on Apprenticeship Expansion "to identify strategies and proposals to promote apprenticeships, especially in sectors where apprenticeship programs are insufficient." The group's final public meeting

occurred on May 10, 2018, culminating with the production of a report containing numerous recommendations.[7]

B. Unemployment insurance (UI) benefits could be made more flexible to facilitate retraining, and the UI system could be used to provide additional information on retraining options

UI benefits are conditional on a displaced worker not being re-hired, discouraging recipients both from quickly finding new employment and from entering an apprenticeship arrangement. (Under Department of Labor rules for registered apprenticeships, these employment arrangements may not be unpaid.) One potential policy option is to allow for a partial collection of UI income support during the apprenticeship period, which would offset the lost earnings of workers during training[8]. However, the empirical evidence on the consequences of this option is scarce. Before discontinuation, a more generous version of this policy option in the state of Georgia allowed workers to receive full UI benefits while earning no pay in apprenticeship programs. This model, known as GeorgiaWorks, was a combination of investments from workers (who earn only UI benefits during the training period), firms (who are investing resources in worker training even if the worker is not paid), and the State government (by paying UI benefits for the retraining period). Notably, the degree of success of the GeorgiaWorks program is the subject of some debate; the program design did not facilitate rigorous *ex post* evaluation.

The UI system is also a valuable touchpoint for providing those experiencing job losses with information on retraining options. A Federal initiative to share information on Pell grant eligibility and suggest training as a possible "avenue to job security and higher wages" during the Great Recession in May 2009 appears to have increased college enrollment among the recipients of this information (Barr and Turner 2015).

C. Federal funding could be reformed to cover high-quality short-term retraining programs

Pell grants, a key Federal program supporting higher education attainment, can be used only for programs exceeding 600 hours of class time per year and are not available to workers who have previously received a bachelor's degree.[9] The grants are not available for workers with "too much" prior education, or for workers with less education seeking to retrain over shorter

[7] For a list of the Committee's final recommendations, please see: https://www.dol.gov/apprenticeship/docs/task-force-apprenticeship-expansion-report.pdf

[8] An in-depth evaluation of UI income support was beyond the scope of this paper.

[9] Federal student loans may still be available for programs that are Pell grant ineligible.

periods of time, perhaps in order to minimize the amount of time they are without an income. Even if Pell grants were available for these programs, workers facing budget constraints may still struggle to pay personal living expenses while undertaking this retraining. Without financial support, some workers will find it necessary to take a new job quickly, even if the job is not in their long-term best interest. Federal support *is* available for these programs through other funding mechanisms beyond Pell, but the dedicated dollars are subject to appropriations and budget caps, whereas Pell is an entitlement whose receipt is limited only by eligibility.

Ensuring that grant aid can be used for high-quality short-term retraining programs (programs shorter than 600 hours) in fields where job opportunities are available may more effectively facilitate the re-entry of workers into employment quickly and with less household budget disruption. A West Virginia retraining program that is not currently eligible for Federal Pell grants is discussed in detail in Box 2 below. Given the heterogeneity in higher education quality, however, programs shorter than 600 hours should be subject to eligibility criteria that will ensure quality for programs accessing Title IV student aid.

D. Both TAA and WIOA programs support transitions back to employment, but alternative models are available

In their current form, the Department of Labor's Trade Adjustment Assistance (TAA) programs for workers and the complementary Unemployment Insurance (UI) program are designed to offer workers assistance in the face of one-time adjustments through trade. TAA is meant to address the needs of workers displaced specifically by enhanced import competition or outsourcing and does not accommodate those displaced by a myriad of other challenges workers face as a result of technological change, changing consumer preferences, increased global interconnectivity, and so on. TAA provides funding for worker retraining, and workers who are displaced by trade and re-enter the labor force as apprentices typically maintain their eligibility for TAA benefits, such as the payment of training costs, even when the apprenticeship pays a salary. TAA also provides wage insurance for workers 50 and older. Younger workers cannot receive this benefit.

Box 2: Pierpont Community and Technical College

Community colleges in partnership with local industries offer some of the most innovative reskilling programs in the United States. These programs have the advantage of addressing a localized skills gap jointly determined by industry and education institutions in the absence of a national survey of skills gaps that would identify these specialized skills as areas of great national need.

For example, the Pierpont Community and Technical College in West Virginia offers workforce retraining opportunities through the Robert C. Byrd National Aerospace Education Center, an aviation technician training program. The Aerospace Center is an example of a successful collaboration between a community college, industry, and Federal grant programs to create workforce opportunities for both young, inexperienced students, as well as more experienced workers who may have been displaced from their previous occupation or are seeking new opportunities.

The Aerospace Center attracts experienced workers coming from other industries such as the military, coal, construction, or oil and gas. Approximately 46 percent of the Aviation Center's student body is comprised of workers seeking vocational retraining, as opposed to recent high school graduates. To meet the diverse needs of such students, the Aerospace Center offers two different programs. Those in the two-year associate's program leave with a Federal Aviation Administration (FAA) certificate, allowing them to work within the field worldwide. Students who enroll in the shorter eight-week program typically become apprentices for aviation companies, which may eventually lead to other credentials and employment in the aviation field, albeit generally without nationwide portability.

The Aerospace Center is in close proximity to local establishments of major aerospace companies, such as Pratt & Whitney and Bombardier. The Center maintains close relationships with these companies, which have direct input in the Aviation Center's training program, ensuring that the program meets labor market needs so students graduate with in-demand skills. The curriculum is governed by FAA-approved coursework, but also encompasses a general education program that offers supports ranging from basic writing and math training to public speaking and digital literacy.

The proximity of students to employers allows the program to integrate a built-in apprenticeship model, through which students gain professional experience by working directly with nearby employers. While CEA is unaware of in-depth reviews of the program's outcomes, the Center affirms that such apprenticeship opportunities, and the location of the Aviation Center itself, contribute to the program's placement rate, which is close to 100 percent.

The Aerospace Center operates through various sources of funding, which allows it to keep tuition costs relatively low. The program receives funding from student tuition as well as through the Perkins Act, State revenue, and local government contributions, as well as grants, including a recent $1 million Federal POWER grant to purchase updated equipment and continue to recruit and train former coal miners and other coal industry workers throughout the state.

Pierpont's Aerospace Center not only offers displaced workers the opportunity to gain new skills and reenter the workforce, but it aims to transition them to a well-paying industry. According to the Bureau of Labor Statistics, aircraft mechanics in West Virginia earn $53,940, on average, far higher than the average state income of $40,250.

Displaced workers not covered by TAA can turn to services offered under the Workforce Innovation and Opportunity Act (WIOA). WIOA provides employment and training services for adults and youths who face significant barriers to employment. This includes, for example, individuals with disabilities, those who have been previously incarcerated, and at-risk youth. Some of the criteria for WIOA eligibility are age and participation in public assistance programs. The WIOA program that focuses on dislocated workers offers adults both career and training services. Through career services, individuals receive general information on the labor market, potential job openings, and can undergo a skills assessment. While basic career services are universally accessible, there are requirements that must be met in order to receive training. One of these requirements is that a participant must not have been able to receive other forms of grant assistance to cover the cost of training. WIOA funds are limited such that eligibility does not guarantee individuals' access to these funds. And WIOA receipt is prioritized for long-term unemployed individuals, although WIOA does support apprenticeships.

The effectiveness of the WIOA programs is the topic of much debate, and certainly the program's eligibility criteria and program administration rules are cumbersome to navigate. Evaluations of the efficacy of TAA programs also provide mixed results. See CEA (2018) for a more complete review of the literature on DOL's TAA program for workers.

One alternative to these programs, proposed by Aldonas, Lawrence, and Slaughter (2007), is to combine both TAA and UI into a more comprehensive adjustment assistance (AA) program. This new program would provide short-term assistance for any displaced American worker, regardless of the reason for displacement. This more flexible framework would offer displaced workers a wider range of services that would help workers receive assistance that caters to their specific needs. A new, universal AA might be better-suited to address displaced workers' needs if it incorporated more innovative features such as relocation assistance and wage-loss insurance, covering the difference between income prior to displacement and the income received in the worker's next job. Overall, proponents of this plan believe it could provide a more diverse and tailored assistance program in line with the modern-day problems face by displaced workers (Dearie and Litan 2018).

6. Other Public Policy Changes to Better Support Reskilling

Some Federal support for displaced workers currently comes in the form of grants to local retraining initiatives, including those at local education institutions. For some institutions, these have been instrumental in enabling investments in needed capital equipment or labor to expand program offerings. However, grants also contain an inherent inflexibility that poorly

suits them to addressing dynamic needs of labor training programs. Industry needs change frequently, with implications for worker retraining initiatives. Grant programs, on the other hand, often have long planning and application windows, prolonged implementation timelines, and narrow spending rules. Grants are also either non-recurring or recurring only with re-application, raising uncertainty over future funding streams, even for successful programs.

For example, a community college requesting a grant to support the employment of an instructor with particular skills for a particular academic program lacks the flexibility to respond to changes in local needs if they shift away from the stipulated program. The institution may also face recruitment challenges without a more open-ended funding stream. Similarly, although it may be tempting to focus Federal funding on workers experiencing a certain type of displacement (trade-related) or in a particular industry, current and future worker displacement may come from a broader set of causes (e.g., automation) and may occur in industries presently unaffected. Keeping programs as flexible as possible reduces the need for continual re-optimization and increases the return on Federal dollars spent.

All of these considerations must be balanced against the recognition that funds are limited and Federal programs are likely to be targeted toward particular communities, if not toward particular types of workers.

7. International Lessons[10]

Reskilling programs in other developed countries may be instructive for improved effectiveness of investments in the United States. Though international models may not be directly replicable, some countries' strategies demonstrate particularly quick transitions into re-employment for displaced workers.

In Sweden, workers have remarkably low unemployment durations, in part due to the assistance from economy-wide job security councils that provide transition services to displaced workers through career counseling and job search assistance, as well as assistance targeting retraining programs. The programs are funded by employer payroll taxes and serve as a sort of social insurance that spreads the risk of job losses across employers and, ultimately, across workers and consumers who will also bear the burden of higher payroll taxes. However, CEA is unaware of any in-depth reviews of this program's outcomes.

[10] CEA did not review cost-benefit analyses of any of the programs described in this section. Rather, the purpose of this section is to offer an overview of the various forms that labor market reskilling programs can take.

Germany has a model for promoting reemployment that privatizes public job placement services. In 2002, the German government introduced a "voucher" system. The system provides compensation to private job placement services that successfully find employment for displaced workers. All workers unemployed for three months or longer are eligible for the program, and the payment rate for successful placement increases with the duration of unemployment.

In the German program, individuals sign placement contracts with private agencies. If the agency finds the worker a job and an employment contract is signed, the agency can redeem the public voucher. Voucher payments are conditional on worker tenure in the new employment arrangement, and if the employment relationship lasts fewer than three months, the voucher payment must be refunded. Vouchers are more likely to be utilized by younger workers with higher skill levels and, overall, private job placement services were tapped by only 2 percent of job seekers once the program was fully implemented.

Winterhager, Heinze, and Spermann (2006) evaluated the success of the program by comparing workers who participated in private job placement services and were therefore voucher-eligible to similar workers who chose to use public job placement services or to seek employment on their own. Over all time horizons, the measured employment rate of those participating in the voucher program was higher than for workers who did not use the voucher system. These results are promising, although it is still worth nothing that selection may be a concern if more motivated job seekers are more likely to use the voucher system.

In addition to the job placement voucher, Germany also utilizes a job training voucher system (Tergeist and Grubb 2006; Besharov and Call 2016). The purpose of this voucher is to provide individuals with the opportunity to choose which training program to participate in. However, eligible training programs must have a proven track record, usually a 70 percent success rate in placing individuals out of unemployment within six months after the end of the program. Strittmatter (2016) found that these training programs tend to have negative employment outcomes in the immediate term as individuals focus on their training and reduce time spent searching for a job. This negative effect can last for up to two years, likely due to the long duration of these vocational programs. But after four years, the voucher system exhibits clear gains: unemployed individuals who utilize the vocational training voucher experience a two percentage point increase in their employment probability when compared to individuals who did not participate such a training program.

Canada has its own labor market model for assisting displaced workers find employment. The Second Career (SC) program in Ontario prepares displaced workers for new careers in growing fields through skills training and needs-based income support (OECD 2015). The program was

launched in 2008 and is funded through a cost-sharing grant and means-based contributions by displaced workers themselves. Displaced workers receive a grant to help cover the cost of tuition, coursework materials, transportation, etc. Each eligible worker is assessed for program "suitability" based on duration of unemployment, work history, labor market prospects, etc. The points-based criteria system is set up so that the program especially caters to high-tenured, low-skilled workers.

When SC was first launched, it successfully hit its three-year target by helping 20,000 displaced workers in only 16 months. Since 2008, over 76,000 displaced workers have utilized SC's services. A 2010 survey indicates that over 93 percent of SC students graduated and that training lasted about nine months on average. Evidence shows that the SC program is successful: more than 61 percent of SC students found jobs within three months of graduating, and 75 percent were employed a year post graduation. In comparison, less than 50 percent of all displaced workers are reemployed within a year after being displaced, and under two thirds are reemployed within 2 years after displacement.

The OECD (2015) notes that SC can be strengthened through compulsory workplace training; in its current form, the program does not require students to undergo on-site training. Mandating work experience in addition to skills training may increase program participants' chances at obtaining a job. Overall, SC is a beneficial—though costly—program. More research is needed to determine SC's net effects, in conjunction with a cost-benefit analysis. Overall, the OECD finds that all Canadian re-employment support programs for displaced workers do an adequate job of providing job search assistance and skill training services. However, the OECD notes that relatively few displaced workers utilize these services.

South Korea established a publicly-funded Employment Success Package (ESP) program in 2009 which offers intensive job-search assistance to specific groups of unemployed individuals (OECD 2013). The beneficiaries include low-income, middle-aged individuals and unemployed youth, and since 2012, ESP also covers workers displaced as a result of Korea's Free-Trade Agreement with the United States, regardless of their income level. The program involves one-on-one counselling and a 4-week career guidance course intended to improve individuals' morale. Group counselling is optional, though those who complete the course are awarded a bonus (equivalent to 7 percent of the average monthly wage). The second stage of the program links individuals to various services such as vocational training, which is both subsidized and comes with a stipend for living expenses, and provides them with work experience through a "transitional government-funded job" that may last up to 5 months. The final stage of ESP is the job-placement stage, during which participants find employment with the help of public job centers as well as private employment agencies that the government contracts-out.

Overall, ESP's comprehensive three-stage program is designed to guide individuals into employment within year. An evaluation of the program in 2009 found that over 76 percent of ESP participants were employed by the time they finished their individually determined program timetables. Though this program appears successful in assisting displaced workers, the OECD found that private agencies contracted to participate in ESP complain that the system is inflexible and does not allow them to offer their services in the most effective manner. The OECD recommends that the current system be adjusted so that private agencies are better able to exercise their strengths, enabling more efficient use of public money.

8. Conclusions

Reviving American economic growth has been a major accomplishment of the Trump Administration's first year. However, continuing the momentum will depend on the availability of workers with the appropriate skills to take advantage of new job opportunities, and on the ability to draw potential workers out of non-participation and into employment. The dynamics of technological change and innovation will also drive reskilling needs in the future, particularly for workers without a college education. The concentration of investment in skill development and education among workers with a bachelor's degree and those under age 25 is a strong indication that America's reskilling effort is not optimized to address future challenges.

Tighter connections between participants in reskilling activities, and more coordination and information sharing, will be critical to success. American workers may have incentives to pursue retraining, but the information gap between workers, education institutions, and industry job creators remains a major hurdle. The Federal government has a unique role to play by re-examining current financial assistance spending, and redesigning programs to better serve anticipated needs.

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